Opuscula Philolichenum

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Opuscula Philolichenum is published by the editor, and is not to be considered affiliated in any respect with The Academy of Natural Sciences of Philadelphia. This journal is intended to provide an outlet for the publication of short papers in lichenology, especially small floristic works, checklists, modest taxonomic revisions. Unlike other similar journals that publish such works, nomenclatural/taxonomic acts are allowed. *Opuscula Philolichenum* was created, in part, as a response to the issue of electronic publication that is currently faced by the scientific community. While the editor does not advocate allowing nomenclatural changes to be made in fully electronic publications it seems illogical to ignore the possibilities of the technological advancements of the last century. While *Opuscula Philolichenum* is a printed publication (as required by the ICBN) the papers published within its pages are available free of charge in pdf. format on the editor's website (http://clade.acnatsci.org/lendemer/opus.html).

The editor's website has been indexed in several search engines and thus papers appearing in this journal are routinely found in search results for related topics. The dominance of technology (especially the internet) in our present-day society has drastically changed our lives and the field of lichenology. Though not all changes may be for the better, modern technology allows the exchange of information and ideas at an ever increasing rate. The editor hopes that this journal facilitates the exchange of ideas and collaboration not only within the field of lichenology but between lichenologists and other scientists, land managers, government agencies such as the National Park Service, and the general public.

The editor would like to take the to opportunity to thank those who graciously provided peer review of the papers published in this volume: I.M. Brodo, B. Coppins, R. Dirig, J.A. Elix, A. Fryday, R.C. Harris, K. Knudsen, J. Kocourková, J. Lawrey, M. Kukwa, A. Orange, J. Sheard, H. Sipman.

Guide for submission:

Authors wishing to submit a manuscript for publication in *Opuscula Philolichenum* should contact the editor prior to submission to confirm that the paper conforms to the mission of the journal (outlined above). Manuscript submissions should be left unformatted and authors should consult a recent issue of *Opuscula Philolichenum* for style. All submissions are subjected to review by at least two peer reviewers and, following acceptance are formatted by the editor.

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Porpidia soredizodes (lichenized ascomycota) in North America

ALAN M. FRYDAY[1], JAMES C. LENDEMER[2], AND NATALIE M. HOWE[3]

ABSTRACT. – The occurrence of the sorediate species *Porpidia soredizodes* (Nyl. *ex* Lamy) J.R. Laundon in North America is confirmed based on a collection from the zinc contaminated superfund site at Lehigh Gap, Carbon Co., Pennsylvania. Another recent collection from Connecticut is also referable to *P. soredizodes* and two earlier collections from eastern Canada that were provisionally referred to this species are re-examined.

Recently, while surveying the lichen communities of Lehigh Gap, Carbon County, Pennsylvania, two of us (JCL & NMH) observed a large population of a sorediate crustose lichen that we had not seen previously while collecting in eastern North America. The species was abundant on acidic rock talus on the upper slopes of the western side of the Gap and had significant cover in several plots being studied by the third author. We collected several specimens of the lichen and brought them back to Philadelphia where TLC revealed that they contained stictic acid and we determined that they likely represented a species of *Porpidia*, a determination supported by the presence of immature apothecia on some of the collections. The first author agreed to examine the specimens and determined that they represented *P. soredizodes* (Nyl. *ex* Lamy) J.R. Laundon, a species not definitely previously reported from North America. Richard Harris, at the New York Botanic garden (NY), kindly sent us four more sterile, sorediate, saxicolous crusts containing stictic acid from north-east North America and one, from Connecticut (see below), was also *P. soredizodes*.

Porpidia soredizodes is characterized by having a thin, gray areolate thallus containing stictic acid (K+ yellow, Pd+ orange), lacking an amyloid medulla, and with numerous, small (*ca.* 0.3 mm diam.), discrete, usually tuberculate soralia containing blue-grey or cream-colored soredia (Fig. 1A). Poorly developed specimens may have a scurfy, almost non-existent thallus. Apothecia are rare, but suggest that this taxon is the sorediate counterpart of *P. crustulata* (Ach.) Hertel & Knoph (Rambold 1989, Gowan & Ahti 1993). *Porpidia soredizodes* is a frequent species in northern and central Europe where it occurs on siliceous rocks and pebbles in lowland situations (Galloway & Coppins 1993). It has also been reported from Australia (Rambold 1989).

Porpidia soredizodes superficially resembles *P. tuberculosa* (Sm.) Hertel & Knoph, but that species has a thallus containing confluentic acid (K–, Pd–) and an amyloid (I+ blue) medulla. Three other sorediate *Porpidia* taxa that contain stictic acid are known from eastern North America: *P. ochrolemma* (Vain.) Brodo & R. Sant., *P. superba* f. *sorediata* Fryday, and the un-named sorediate morph of *P. albocaerulescens* (Wulfen) Hertel & Knoph. *Porpidia ochrolemma* is easily distinguished by its persistently orange thallus, whereas *P. superba* f. *sorediata* has a smooth, cracked-areolate, creamy-white thallus with raised soralia and occurs on basic and/or flushed rocks in upland areas (Fryday 2005), and *P. albocaerulescens* differs in having a paler (creamy to pale gray), smooth, continuous, cracked-rimose, thallus that is usually much thicker than that of *P. soredizodes*. The sorediate morph of *Porpidia albocaerulescens* is also usually fertile (Gowan 1989a), in which case it is readily distinguishable from *P.*

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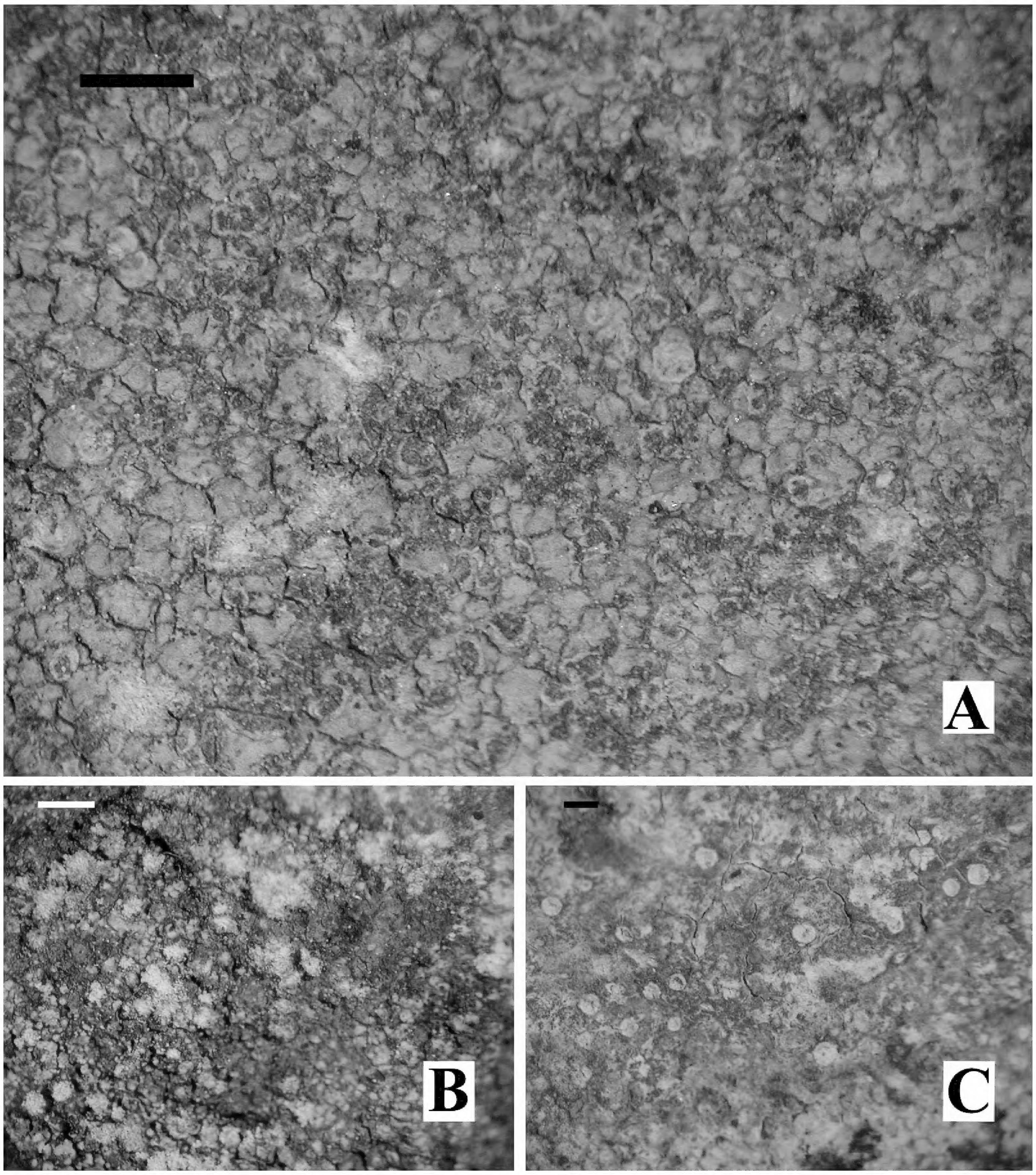

Figure 1. *Porpidia soredizodes*: A, *Lendemer 6758* from Pennsylvania; B, *Gowan 3573* from New Brunswick; C, *Waghorne 308* from Newfoundland. Scales: A = 1 mm; B & C = 0.5 mm.

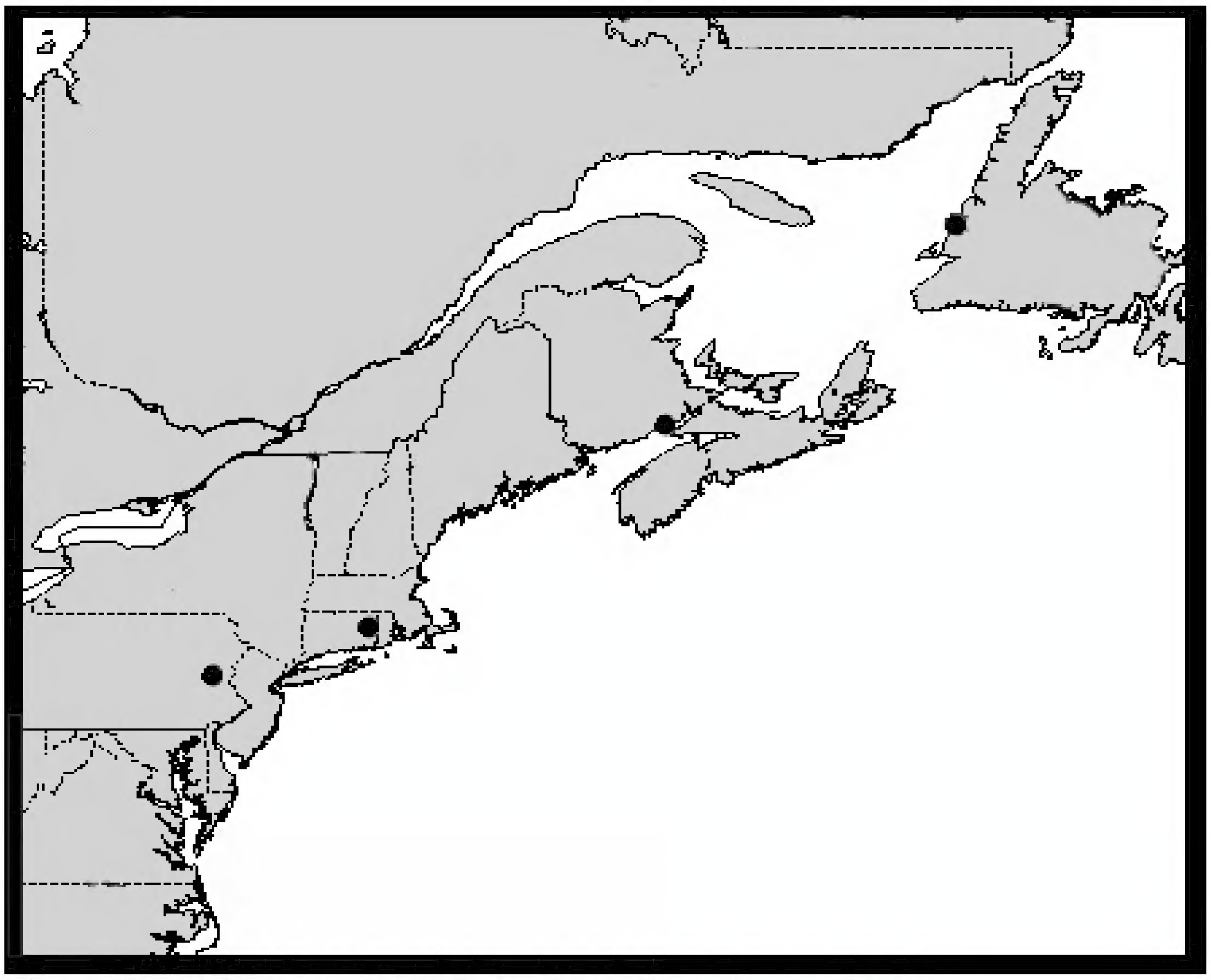

Figure 2. The North American distribution of *Porpidia soredizodes*.

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soredizodes by its innate, heavily pruinose apothecia. The collection of *P. soredizodes* from Lehigh Gap has several sessile, non-pruinose apothecia.

Gowan (1989a) mentions two collections from eastern Canada as possibly belonging in *P. soredizodes*. One of these, collected by Waghorne from Newfoundland (see below; Fig 1C), matches the description of *P. soredizodes* except that the thallus lacks stictic acid. However, lichens that usually produce stictic acid often lack lichen substances or produce norstictic acid in its place (e.g. *Rhizocarpon reductum* Th. Fr.; Fryday 2000). In fact, Gowan (1989b) found that 34% of the 134 specimens of, the closely related, *P. crustulata* that she tested lacked lichen compounds. As the alternative determinations; that this is a specimen of, the morphologically identical, *P. tuberculosa* but lacking both confluentic acid and an amyloid medulla, or it is an undescribed species, are even less likely, it is our opinion that this specimen represents a specimen of *P. soredizodes* lacking stictic acid. The other specimen mentioned by Gowan (op. cit.), from New Brunswick (see below; Fig 1B), although containing stictic acid is more problematic because it has a thin, slightly granular thallus and slightly convex and effuse soralia with white, farinose soredia. Although Gowan says the substratum is HCL+ rock, three pieces were tested with 15% HCl and 50% HNO_3 but no effervescence was observed. This specimen is provisionally referred to *P. soredizodes*, but the possibility that it is an anomalous specimen of *P. superba* f. *sorediata*, or that it belongs in a genus other than *Porpidia*, cannot be discounted. We consider that Gowan (1989a) was correct not to accept *P. soredizodes* as a North American species on the strength of these two specimens but, given the new positive records from Pennsylvania and Connecticut reported here, they should now be considered as additional records of that species (see Figure 2 for the distribution of *P. soredizodes* in North America).

Interestingly, both the New Brunswick and Pennsylvania collections support a lichenicolous fungus with small perithecia and hyaline, 1-septate ascospores measuring *ca.* 15 x 5 µm. However, these are not congeneric as the perithecia on the New Brunswick collection are *ca.* 0.05 mm in diam. and immersed in the thallus areoles, whereas those on the Pennsylvania collection are *ca.* 0.1 mm diam. and occur in small "islands" where the thallus is apparently absent. There are also anatomical differences in that the New Brunswick collection has persistent (although sparse), simple paraphyses and an I– hymenium, whereas the Pennsylvania collection has an I+ blue hymenium but no apparent paraphyses.

Sorediate crustose lichens are one of several groups that are generally overlooked and under collected in North America so the discovery of a species previously unknown from North America is not surprising. The discovery is significant because when Nash (1974) surveyed the lichens of Lehigh Gap he found a simplified community of fewer than a dozen species none of which attained significant cover. Nash concluded that the simplification of the lichen community of the Gap was due to zinc, cadmium, and lead contamination from a zinc smelter in the nearby town of Palmerton, Pennsylvania, 2 km to the northeast. The discovery of *Porpidia soredizodes* and other lichens in the Lehigh Gap is a clear indication that the lichen community is in the early stages of recovery following the closure of the smelter in Palmerton in 1980. The changes in the lichen community of Lehigh Gap will be discussed in detail in a separate publication (Howe and Lendemer in prep.).

Specimens Examined. – **USA**. Connecticut. Windham co.: Windham, W of Windham Airport, SSW of Mansfield Hollow Dam, Mansfield Hollow State Park, 41°41' N 72°11'W, ca. 100 m, *Cladonia*-dominated gravel barren, artificial talus slope of dam, and outwash area blow dam, 28 July 2002, *R.C. Harris 46229* (ny!). Pennsylvania. Carbon co.: Lehigh Water Gap Superfund Site, W-side of Lehigh Gap above railroad grade, along transect line, SE of Palmerton, Lehighton Quad., 40°47'30"N, 75°37'47"W, 600 ft. [183 m.], rocky, north-facing slope, contaminated by cadmium, lead and zinc, on rock, 2 May 2006, *J.C. Lendemer 6758 & N.M. Howe* (ph!, msc!). **CANADA**. Newfoundland. Near Lark Harbor, Bay of Islands, *A. C. Waghorne 308* (min!). New Brunswick. Saint John co.: Fundy National Park, mouth of Rossiter Brook, north-facing cliffs above brook's estuary, 45°32'N 65°06'W well lighted, HCl+ rock, 23 June 1980, *S. P. Gowan 3573* (canl!).

ACKNOWLEDGEMENTS

We thank the curators of CANL, MIN, and NY for the speedy loan of specimens in their care. We also thank the Lehigh Gap Wildlife Refuge for allowing us (JCL and NMH) to collect on their property, and Irwin Brodo and Richard Harris for providing peer review of the manuscript.

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Lepraria adhaerens: A new species from North America

KERRY KNUDSEN[1], JOHN A. ELIX[2], AND JAMES C. LENDEMER[3]

ABSTRACT. – *Lepraria adhaerens* K. Knudsen, Elix & Lendemer is described as a new species of lichenized fungi growing usually over mosses and lichens on rock and soil, in southern California, Missouri and Pennsylvania. It is characterized by the presence of pannarin and zeorin.

Keywords: *Lepraria*, lichenized Ascomycetes, North America, California, Santa Monica Mountains, Ozarks, Pennsylvania, Stereocaulaceae.

Lepraria is a world-wide genus, widely distributed in North America on soil, bryophytes, bark, and rock with 21 taxa reported (Esslinger 2006) but that was reduced to 20 taxa as we agree that *L. frigida* J.R. Laundon is a synonym of *L. eburnea* J.R. Laundon (Tønsberg 2004). However, the recent description of *Lepraria santamonicae* K. Knudsen & Elix (2007) again increased the number of taxa to 21.

In a continuation of our studies of the genus *Lepraria* in North America (Knudsen et al. 2006; Knudsen & Elix 2007) we describe *Lepraria adhaerens*, a species widely distributed across the continent with a distinctive blue-gray thallus and unique chemistry of pannarin and zeorin.

Lepraria adhaerens K. Knudsen, Elix & Lendemer, ***sp. nov.***

Thallus leprosus, diffusus, granulosus, caesius, granula plerumque sine hyphyis hyalinis projectis, substrato adhaerens. Substantiae diagnosticae pannarinum et zeorinum continente.

TYPE: USA. CALIFORNIA. SAN DIEGO CO.: Torrey Pines State Park, 32° 54' 58"N, 117° 19' 56"W, 107 m, thin-soiled opening in maritime chaparral on sandstone bluffs, growing over *Rinodina intermedia*, *Lepraria xerophila*, bryophytes and soil, 13.April.2005, *K. Knudsen et al. 2700* (UCR!, holotype; ASU!, CANB!, PH!, SD!, UGDA!, isotypes).

DESCRIPTION. - Thallus saxicolous, or muscicolous and lichenicolous over soil or rock, but not usually growing directly on soil, diffuse, distinctly blue-gray, but sometimes with a dull brownish hue in part, dispersed to contiguous, either patchy and thin (less than 0.5 mm thick), and spreading up to ca. 2 cm, adhering to mosses, lichens or mineral grains of the substrate or on substrates where it is well-established and dominant, forming a thick (less than 1 mm) areolate crust of fused granules with a loose upper layer, divided by deep fissures between the areoles and covering areas up to several meters; always without lobes or distinct rim; granules lumpy, adhering to one another, 40-100 µm diam., with a colorless outer layer comprised of uneven and indistinct gelatinized hyphae or of irregular, paraplectenchymatous hyphae, ca. 2-4(5) µm diam., one to two layers thick, surrounding an algal core; without projecting hyphae, but frequently producing thin colorless ±thick-walled hyphae, 2-3 µm diam., acting as anchors or rhizines; the

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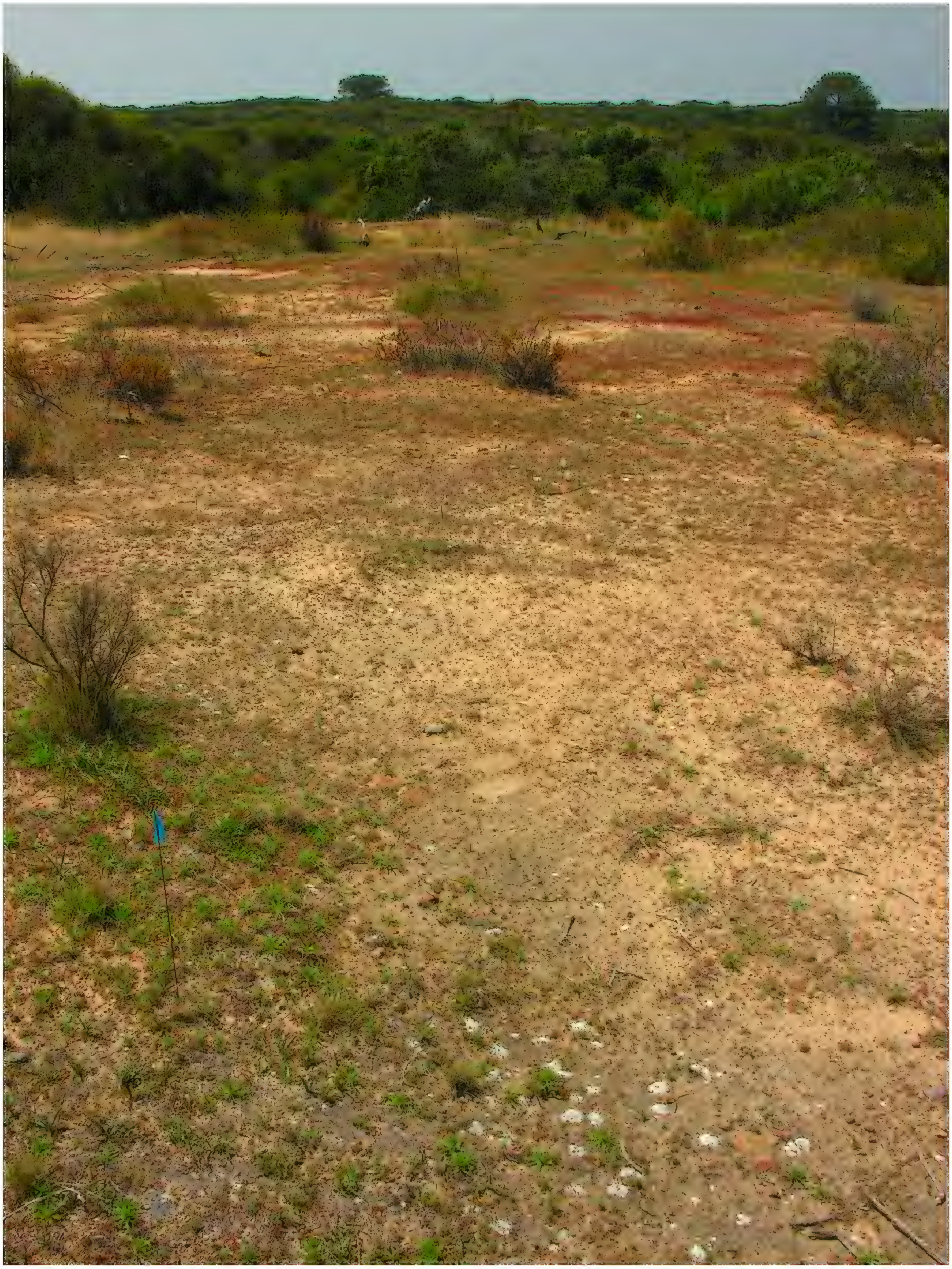

Figure 1. Type locality, Torrey Pines State Park, San Diego County. Blue flag marks location of *Texosporium sancti-jacobi*. *Lepraria adhaerens* is scattered throughout open area on small patches of lichens and bryophytes on a thin sandy soil over sandstone. Image by Rolf Muertter.

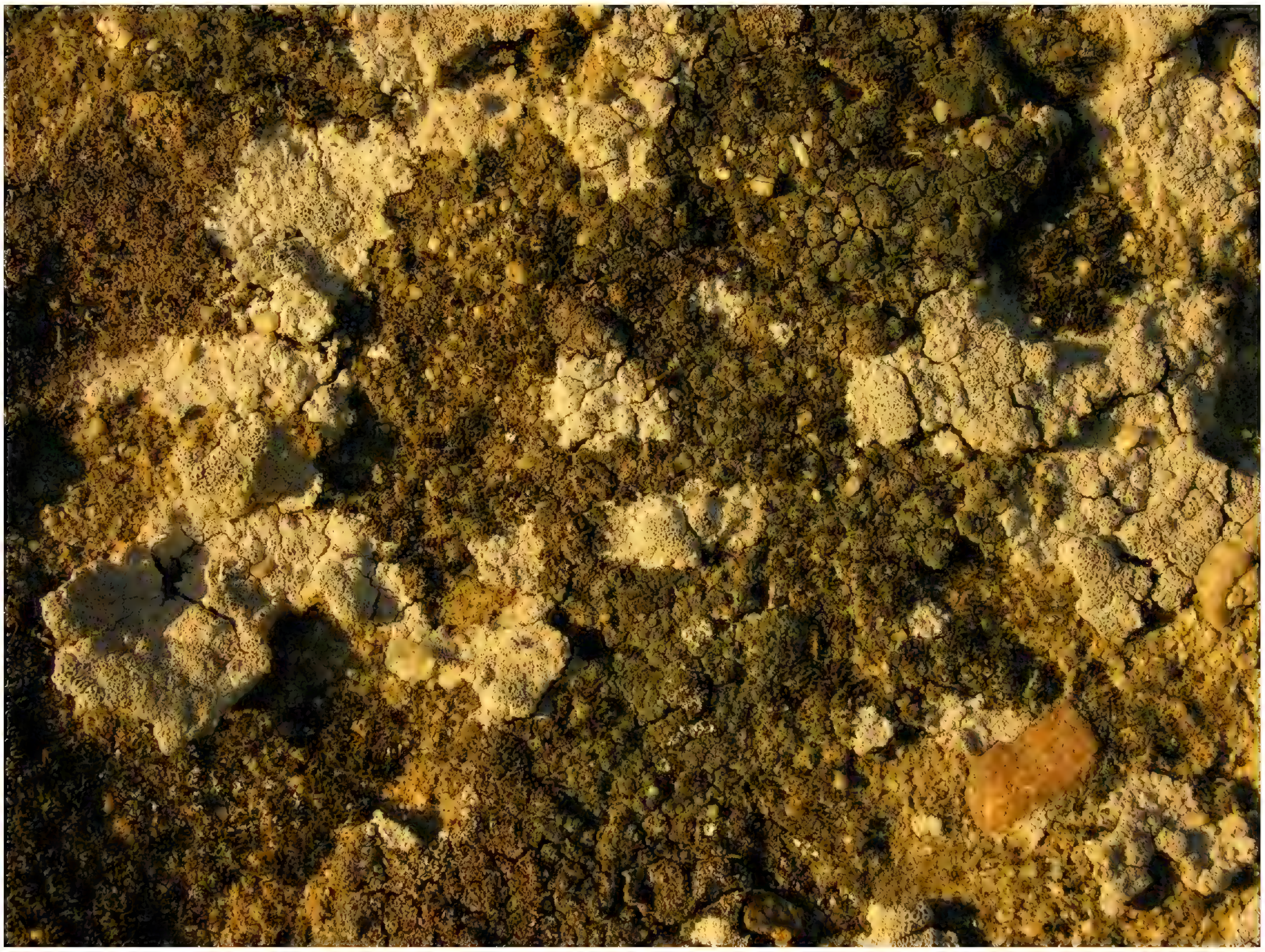

Figure 2. *Lepraria adhaerens* forming a dull areolate crust growing on sandstone of vertical road cut in Weir Canyon, Orange County, California. Image by Rolf Muertter.

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chlorococcoid green algal, 10-14 µm in diam., often aggregating within the enlarged granules which ultimately fragment into sticky agglomerations; without a medulla or lower surface, but older thalli forming a lower necral layer of gelatinized granules which incorporates the remains of lichen or moss hosts mixed with grains of the substrate; in several thalli non-lichenized algae were observed between the granules and more rarely independent fungi or bacteria. Ascomata and conidiomata absent.

The morphology of *L. adhaerens* is most similar to that of *L. santamonicae* (Knudsen & Elix 2007), but is not radically different from other unstratified *Lepraria* species with indeterminate thalli which lack lobes. The most characteristic feature of *L. adhaerens* is the small attaching hyphae and the tendency of granules to readily adhere to one another and the substrate.

Chemistry. – Lichen substances by HPLC/TLC: pannarin (major), zeorin (major or minor)(undetected in only one specimen), ±atranorin (minor), and often with accessory norpannarin (minor), dechloropannarin (minor) and hypopannarin (minor). TLC in solvent C: pannarin and zeorin are evident. Spot tests: K- KC- C- P+ orange, UV-.

Discussion. – This is the first reported co-occurrence of pannarin and zeorin in the genus *Lepraria.* Zeorin is the most common triterpene in lichens and occurs in a number of species of *Lepraria* including *L. lobificans* Nyl. and *L. pallida* Sipman. Pannarin is not known in other *Lepraria* species but is common in the cyanolichen genus *Pannaria* as well as in the phylogenetically distant genera *Lecanora* and *Rinodina.* Pannarin is a β-orcinol depsidone as are the accessories dechloropannarin, norpannarin and hypopannarin present in *L. adhaerens.* Moreover, the biosequentially related chlorodepsidones argopsin and norargopsin have been reported from two *Lepraria* species, namely *L. santamonicae* (Knudsen & Elix 2007) and *L.*

coriensis (Hue) Sipman (Elix 2006). Like *L. adhaerens*, *L. coriensis* contains zeorin as a major component, but contains usnic acid rather than pannarin, whereas *L. santamonicae* lacks zeorin or other substances.

Lepraria adhaerens often has the bluish-gray color of leprose species of Pannariaceae but differs in having a green algal photobiont. *Lepraria santamonicae* is morphologically similar to *L. adhaerens* and may also react P+ orange, but the former species is a greener with just a tint of blue. The chemistry of these *Lepraria* species is best determined by TLC because other indeterminate, non-lobed forms of *Lepraria* which occur in the same region may also exhibit P+ orange reactions (e.g. *L. caesioalba* chemotypes # 1 and #2 and *L. vouauxii*). Although both *L. caesioalba* and *L. vouauxii* usually differ in color being more whitish or yellowish, unfortunately color is not always a reliable character.

At the present time we are taking an inclusive approach to the circumscription of the genus *Lepraria,* including all persistently sterile lichens with a leprose growth form and a green algal photobiont. We recognize that a future revision may lead to new segregations of *Lepraria* but a revision based on molecular studies would be required to differentiate the phylogeny of diverse taxa undergoing convergent evolution.

Etymology. – The specific epithet derives from the adhering of the granules to the substrate and one another.

Ecology and substrate. – *Lepraria adhaerens* usually becomes established at a particular site after it has been pioneered by other lichens or bryophytes on granite, slate, sandstone, or carbonate rock. In thin-soiled openings near the coast of southern California it is not found directly on the soil (except for stray granules) but adheres to other lichens and mosses sometimes being anchored by fine hyphae. This species does not appear to be affected by exposure to full sun or rain. At the type locality it occurs growing on *Rinodina intermedia* Bagl. and the lobed *Lepraria xerophila* Tønsberg and bryophytes in thin-soiled openings in maritime chaparral (Fig. 1). In Weir Canyon in Orange County (Fig. 2) it commonly grows on vertical road cuts, and although these typically have a northerly aspect, they are not usually protected from the weather by overarching protective vegetation or rock outcrops. However, in areas where there is snow (like in the eastern North American populations) this species is usually found in protected crevices or under ledges. In southern California it has not been found in the mountains at elevations where snow is common in the winter.

Distribution. – At present *L. adhaerens* is known in coastal southern California from the Santa Monica Mountains south to San Diego, and in eastern North America in scattered locations in Pennsylvania and Missouri. The apparent distribution pattern may well reflect the activity of collectors. If it is primarily a temperate species, the southern California and Ozark collections may represent relic populations from an ice age distribution. *L. adhaerens* may not have repopulated Canada and the northern border of the United States or it might be found in refugia like those of British Columbia. It is probably overlooked or not collected because it is often mixed with bryophytes. We expect it to be widespread in North America.

Specimens Examined (All paratypes). – **USA**. California. Los Angeles co.: Santa Monica Mountains, Griffith Park, Royce Canyon, 34° 08' 48"N, 118° 18' 43"W, 263 m, in crevices of rock slabs, *K. Knudsen 5809 & T. Proscewicz* (CANB!, UCR!); Santa Monica Mountains, Latigo Canyon, 34° 04' 50"N, 118° 47' 48"W, 571 m, on slate outcrop and soil on mosses, *Cladonia*, and other lichens, *K. Knudsen 1586* (UCR!, PH!). Orange co.: Santa Ana Mountains, Weir Canyon, 33° 49' 54"N, 117° 43' 12"W, 403 m, over mosses and lichens on north-facing sandstone vertical road cut, *K. Knudsen 6422 & R. Muertter* (CANB!, UCR!). Riverside co.: Santa Ana Mountains, San Mateo Wilderness Area, Tenaja Canyon, 33° 31' 02"N, 117° 23' 38"W, 458 m, on shaded boulder on moss, *J.C. Lendemer 4393 & K. Knudsen* (PH!); Menifee Hills, 33° 37' 14" N, 117° 13' 57" W, 632 m, among boulders on moss on hilltop, *K. Knudsen 384* (UCR!). San Diego co.: Cabrillo National Monument, San Diego, along Bayside Trail, 32° 40' 39"N, 117° 14' 21"W, 12 m., *K. Knudsen 2658 & A. Compton* (PH!). Missouri. Crawford co.: Woodson K. Woods Recreation Area, along Meramaca Farms Road, 37° 56' 11"N, 91° 30' 40"W, 274 m., on dolomite outcrop beneath under hang growing on filamentous green algae, *J.C. Lendemer et al. 6092* (PH!). Lawrence co.: Fall Hollow Gorge, in ravine along tributary of Goose Creek, 37° 07' 35"N, 93° 38' 20"W, 381 m, on sandstone on lichens and mosses, *J.C. Lendemer et al. 6143* (PH!). Pennsylvania. Montgomery co.: Fulshaw Craeg preserve, on south-facing slope of Ridge Creek Valley, 40° 20' 28"N, 75° 28' 08"W, 300-400 m., in niche of large shaded diabase boulder, *J.C. Lendemer 2183 & A.F. Rhoads* (PH!). Monroe co.: Delaware Water Gap National Recreation Area, Mount Minsi, 40° 57' 48"N, 75° 08' 08"W, ca. 300 m, on shaded sandstone and unknown host, *J.C. Lendemer 6796 & N. Howe* (PH!).

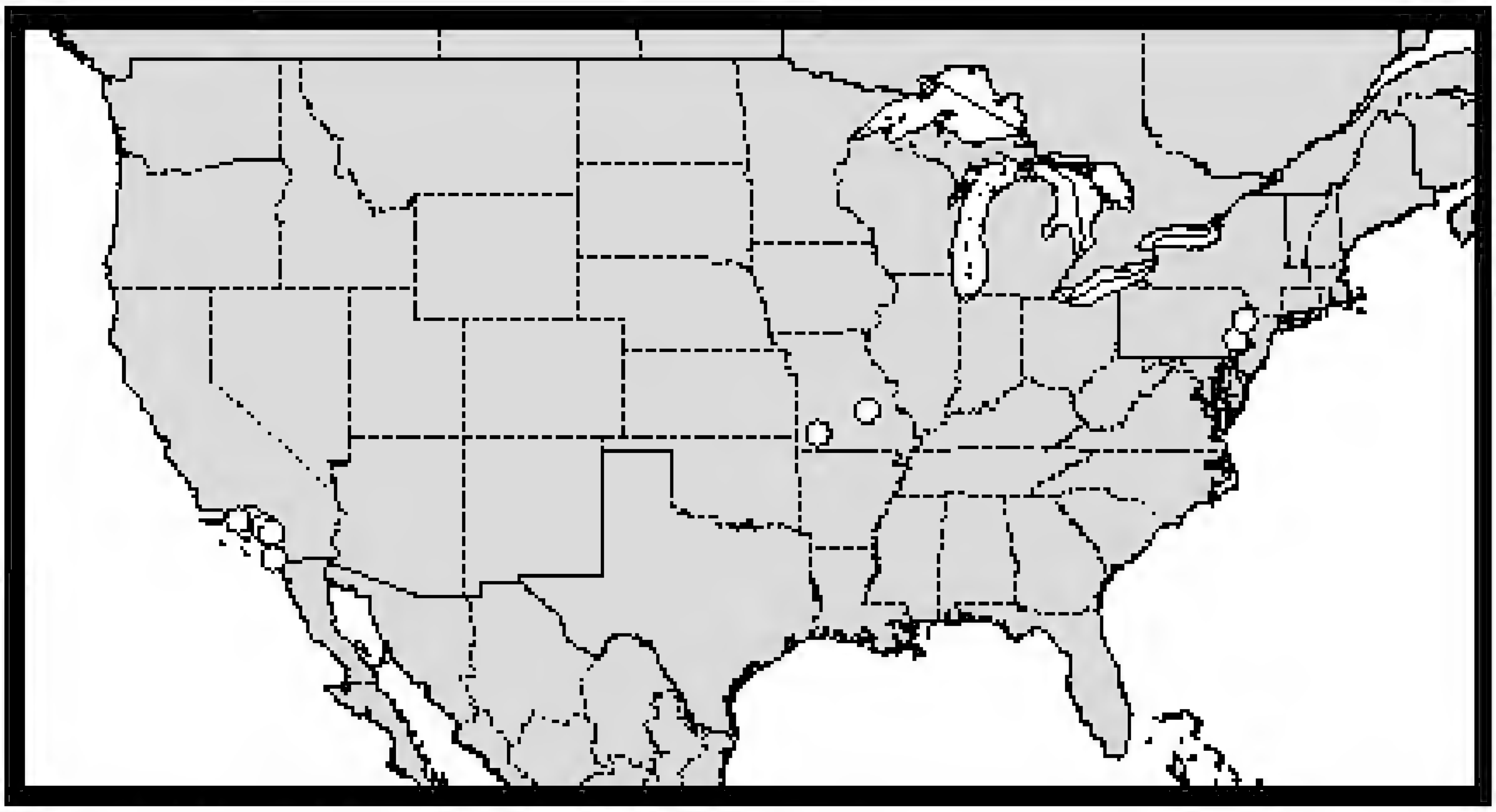

Figure 3. Distribution of *Lepraria adhaerens* in North America.

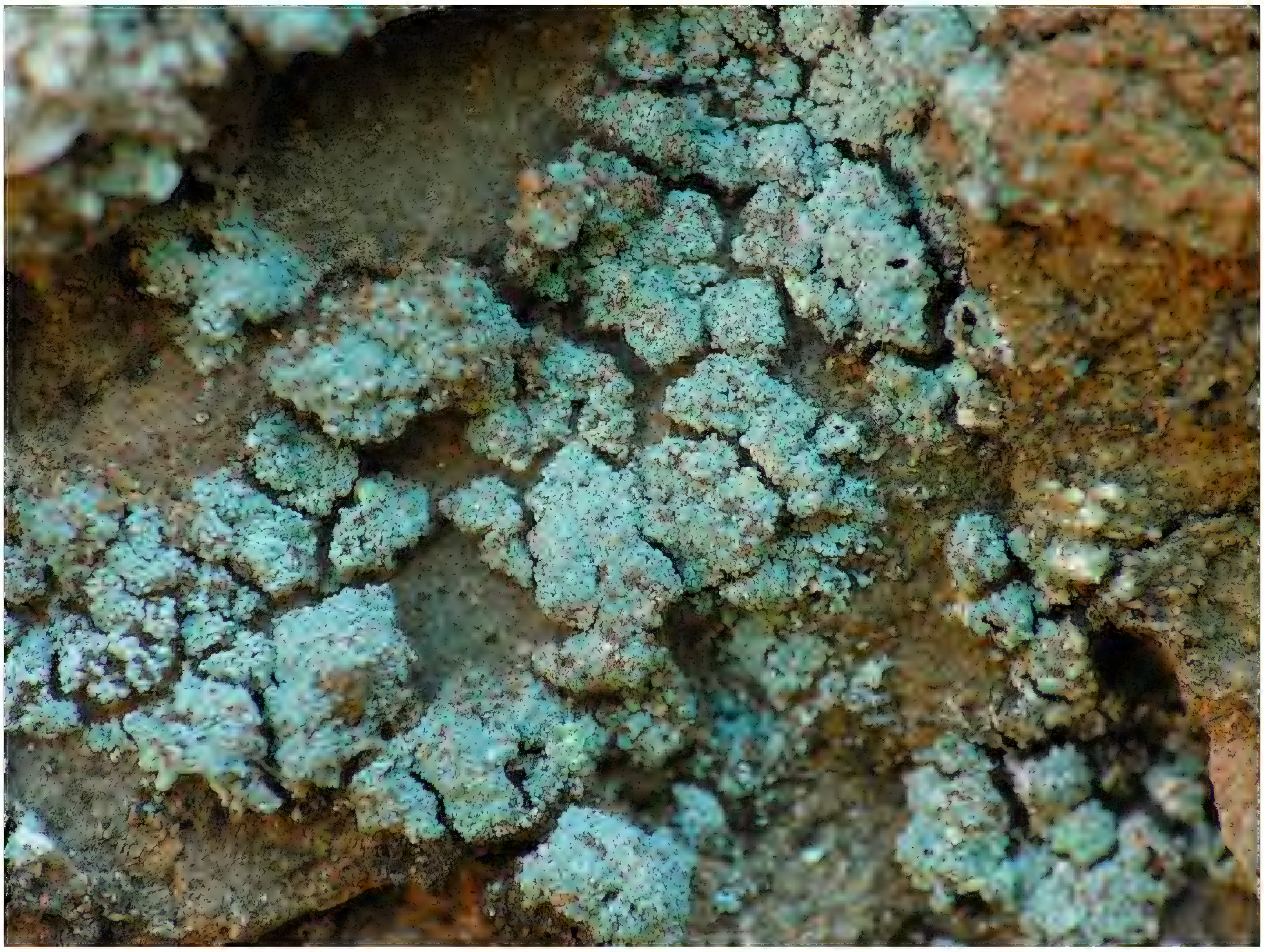

Figure 4. *Lepraria adhaerens.* Malibu Canyon. Image by Rolf Muertter.

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We thank Harrie Sipman and Martin Kukwa for reviewing this manuscript. Thanks also to Mary Ann Hawke of the San Diego Natural History Museum, Darren Smith for access to Torrey Pines State Park, Teresa Proscewicz for access to Griffith Park, Andrea Compton for access to Cabrillo National Monument, Trish Smith for access to Weir Canyon, and Rolf Muerrter for photographs.

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New or Interesting Lichenicolous Heterobasidiomycetes

Paul Diederich[1]

ABSTRACT. – Three lichenicolous *Tremella* species are described as new: *T. nashii* (on *Usnea* from the USA and Norway), *T. nieblae* (on *Niebla* from Mexico and the USA) and *T. tuckerae* (on *Ramalina* from the USA and Ireland). A further new species on *Flavoparmelia* from the USA is left unnamed (as *Tremella* sp. 7). *Cystobasidium hypogymniicola* is recorded for the first time on *Cavernularia* (in Norway), and *Tremella caloplacae* for the first time on *Xanthoria* (in Canada and Greenland).

In my monograph of lichenicolous heterobasidiomycetes (Diederich 1996), I recognized and described one species of *Biatoropsis*, two of *Chionosphaera* (one tentatively named), two of *Cystobasidium*, three of *Syzygospora* (one only provisionally included there), and 46 of *Tremella*. Six species of *Tremella* were left unnamed (called *Tremella* sp. 1 to 6), as the available material was not sufficient for a type. Roberts (1997) added a further lichenicolous species of *Chionosphaera*, *C. coppinsii* Roberts. Diederich (2003) described the new *Tremella lethariae* Diederich for *Tremella* sp. 4, and Sérusiaux et al. (2003) published the new combination *T. caloplacae* (Zahlbr.) Diederich for *Tremella* sp. 1.

In the meantime, I have examined large numbers of additional *Tremella* specimens, many from unusual hosts, including a number of new species. This paper will deal with two species collected on new hosts, give descriptions of three new species, and briefly describe a further new species that will be left unnamed as *Tremella* sp. 7.

The methods of study are the same as in Diederich (1996). Macroscopical photographs were done using a Leica MZ 7.5 binocular microscope with a Nikon Coolpix 4500 digital camera.

The Species

1. *Cystobasidium hypogymniicola* Diederich (on *Cavernularia hultenii*), Fig. 1.

Description of the specimens on *Cavernularia*. - Basidiomata absent; fungus inducing the formation of pale, rarely brownish, strongly convex, sometimes irregular galls on the host thallus with a smooth surface, 0.1-1.2 mm diam. Probasidial initials ellipsoid, situated in or below the cortex of the galls. Context hyphae and fertile hyphae difficult to study, clamp connections and haustorial branches not observed. Probasidial initials sub-spherical to ellipsoid, thick-walled, basal clamp not observed; hyphidia and cystidia absent. Basidia, when mature, composed of an ellipsoid, thick-walled probasidium, 12-22 × 4-6.5 µm, and a cylindrical, generally bent, thin-walled, often deciduous, upper part (meiosporangium), at least 30 µm long and 3-5 µm diam.; upper part with up to 3 transverse septa, individual cells collapsing after spore production, each with one epibasidium; epibasidia more or less perpendicular to the basidium, subulate, 1-2 µm thick, at least 2 µm long, not or poorly refractive at the apex. Basidiospores ellipsoid to fusiform, more or less symmetrical, with a distinct, not or poorly refractive apiculus at the lower end, 7-9.5 × 4-7 µm. Anamorph not observed.

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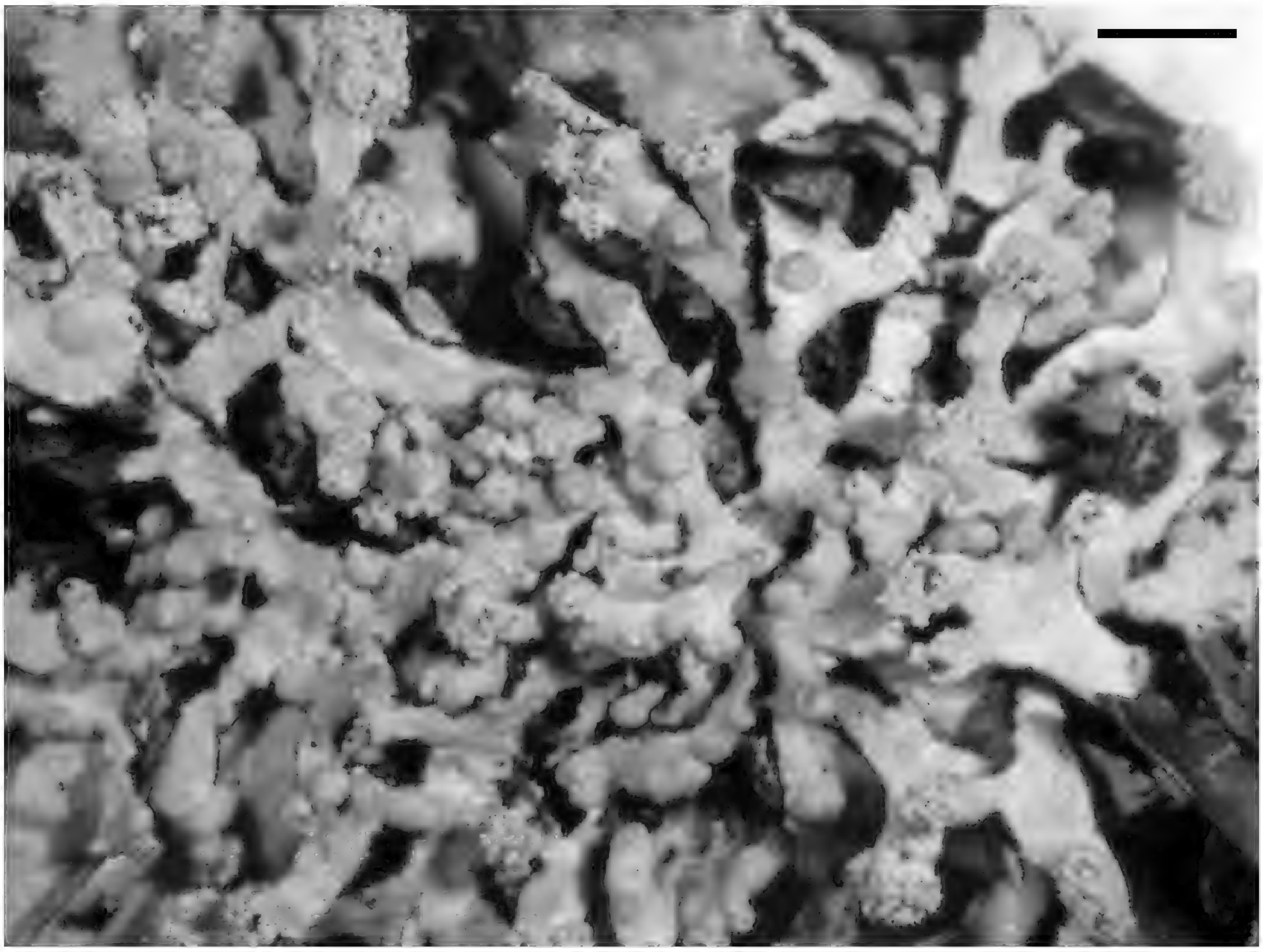

Fig. 1. *Cystobasidium hypogymniicola* on *Cavernularia hultenii* (*Tønsberg 30510*). Scale bar = 1 mm.

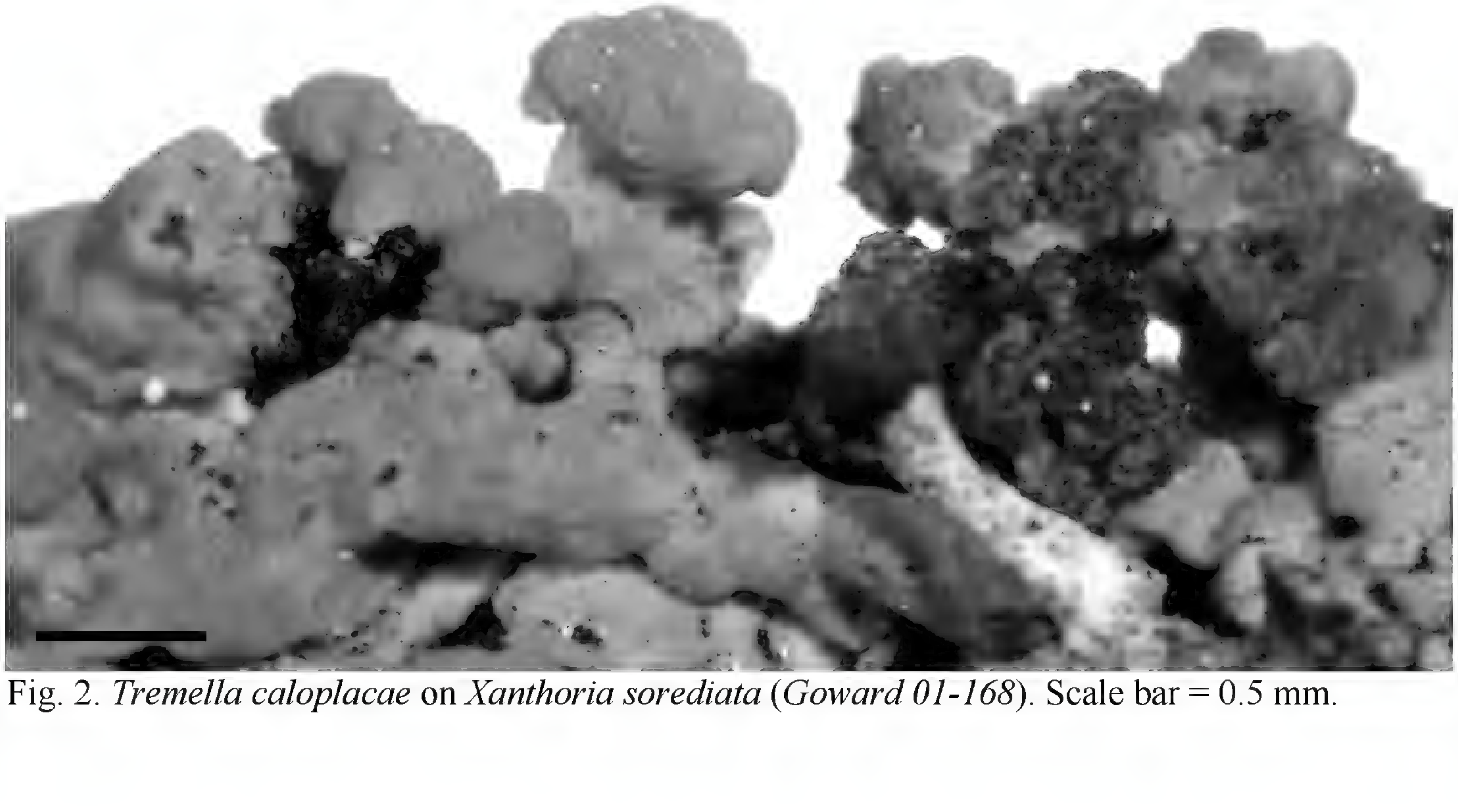

Fig. 2. *Tremella caloplacae* on *Xanthoria sorediata* (*Goward 01-168*). Scale bar = 0.5 mm.

Hosts. - *Cystobasidium hypogymniicola* was known from *Hypogymnia imshaugii*, *H. physodes* and *H. vittata*. Here I report it from a new host genus, *Cavernularia hultenii*, inducing the formation of convex galls, but otherwise not visibly damaging the host.

Distribution. - *Cystobasidium hypogymniicola* has been collected on *Hypogymnia* in North America (Canada and USA) and in Scandinavia (Finland and Norway) (Diederich 1996, 2003, Holien 2001). On *Cavernularia*, it is known from four localities in Norway.

Discussion. - The specimens on *Cavernularia hultenii* are microscopically very similar to *Cystobasidium hypogymniicola*. The basidia are slightly narrower (11-19 × 7-11 µm in the specimens on *Hypogymnia*), but this might just reflect the infraspecific variability and is certainly also a result of the difficulties to study these specimens microscopically. Macroscopically, the galls on *Hypogymnia* are much larger, often becoming bullate, and reach 17 mm diam. However, young galls on *Hypogymnia* are almost identical to those on *Cavernularia*. Without molecular data it is almost impossible to determine if the specimens on *Cavernularia* represent a distinct species, or if they belong to *C. hypogymniicola*, with smaller galls as an adaptation to a different host. As almost all lichenicolous heterobasidiomycetes appear to be strictly host specific (the only exception being species of *Chionosphaera*), and as both host genera *Cavernularia* and *Hypogymnia* group together in phylogenetic studies (e.g. Thell et al. 2004), it is reasonable to assume that the material on both host genera belongs to the same species.

Specimens Examined (all on *Cavernularia hultenii*). - **Norway**. Nord-trøndelag: Overhalla, farm Grande, along gravel road, 64°29'N, 12°00'E, 50 m, 2001, *T. Tønsberg 30510* (bg-l70660!); Snåsa, N of Jørstadmoen, W of Finnsås, Finnsåsmarka, 64°13'N, 12°13'E, 60 m, 2001, *T. Tønsberg 30481* (bg-l70643!); Meråker hd, Tevldalen, 1950, *R. Santesson s.n.* (ups!); Lånke hd, 1938, *S. Ahlner s.n.* (ups!).

2. ***Tremella caloplacae* (Zahlbr.) Diederich** (on *Xanthoria sorediata*), Fig. 2.

Hosts. - *Caloplaca* species (incl. *C. arenaria*, *C. arnoldii*, *C. aurantia*, *C. carphinea* and *C. saxicola*) (Sérusiaux et al. 2003), here newly reported from *Xanthoria sorediata*.

Distribution. - The species was known from several European countries (Sérusiaux et al. 2003) and is here reported as new for Canada (British Columbia) and Greenland.

Discussion. - *Tremella caloplacae* is known from several species of *Caloplaca*, on which it grows intrahymenially, without the formation of distinctive basidiomata. The two collections on *Xanthoria sorediata* are macroscopically very distinct, as the fungus induces the formation of conspicuous galls concolorous to the host thallus, up to 1 mm diam., but microscopically, it does not differ from material on *Caloplaca*. Morphological and anatomical characters do not allow identifying if all this material represents one or several species.

Recent phylogenetic studies (Gaya et al. 2003) suggest that neither *Caloplaca* nor *Xanthoria* are monophyletic. Instead, two distinct lineages are recognized by these authors. "Lineage 1" (that includes the type of *Xanthoria*) comprises several known hosts of *Tremella caloplacae* (*Caloplaca arnoldii*, *C. saxicola* and *Xanthoria sorediata*), whilst "lineage 2" (that includes the type of *Caloplaca*) comprises one known host (*C. aurantia*). As almost all known lichenicolous heterobasidiomycetes are strictly host-specific, the broad host-spectrum of *T. caloplacae* suggests that it may actually be made up of several cryptic species. As long as no molecular data of *Tremella* specimens from Teloschistaceae are available, however, I prefer to treat all these specimens as one species.

Interestingly, this is the first record of a lichenicolous heterobasidiomycete from Greenland.

Specimens Examined. - **Canada**. British Columbia: Crown Lake, Marble Canyon Provincial Park, 25 km NE of Lillooet, 50°52'N, 121°41'W, 600 m, on *Xanthoria sorediata*, 2001, *T. Goward 01-168* (ubc!, hb. diederich!). **Greenland**. Qagssiarsuk: 61°8-10'N, 45°32-35'W, 0-250 m, on *X. sorediata*, 2005, *M. Kukwa 4385a* (ugda!, hb. diederich!).

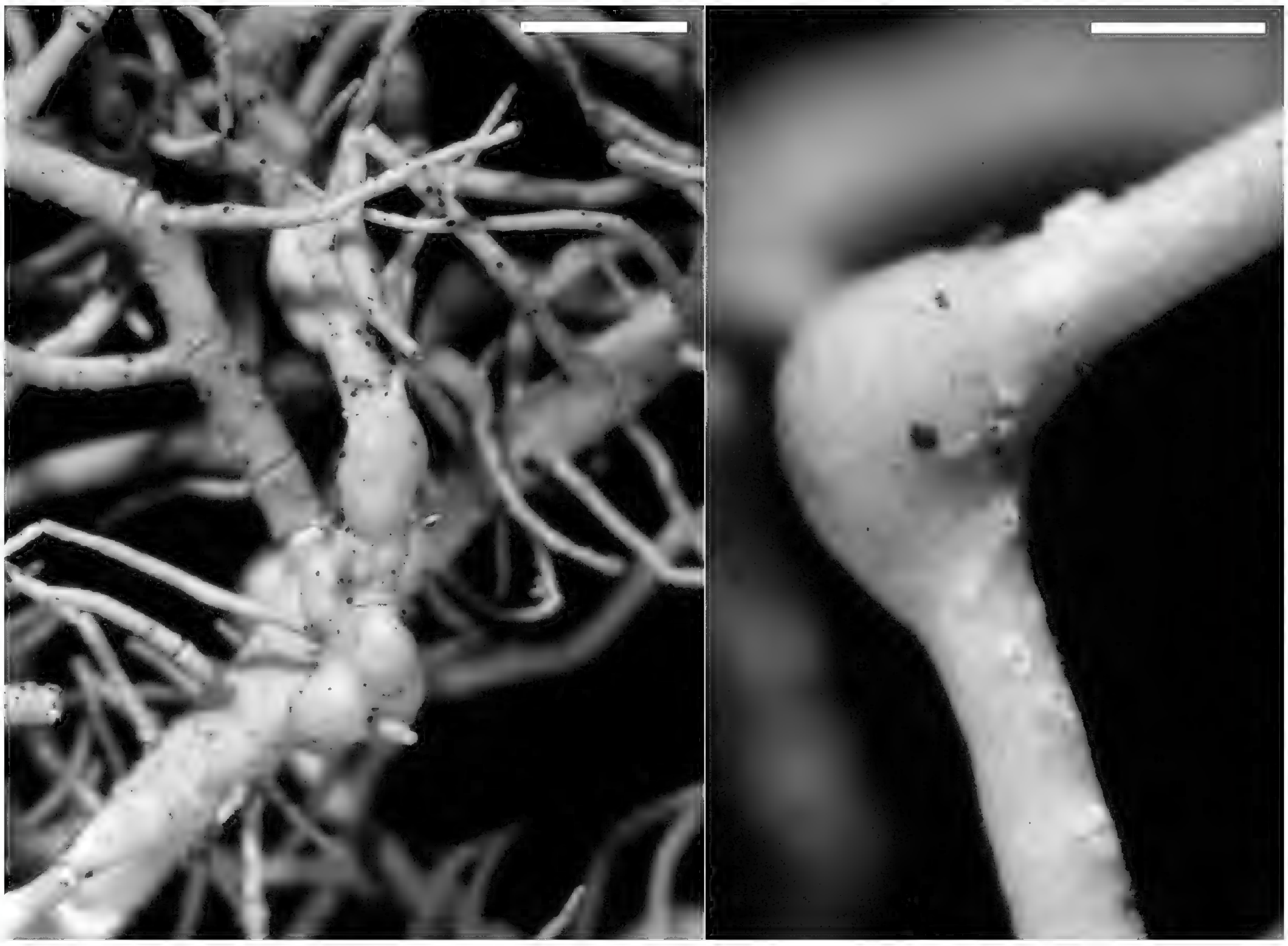

Fig. 3. *Tremella nashii* (holotype). Scale bars: left = 1 mm, right = 250 µm.

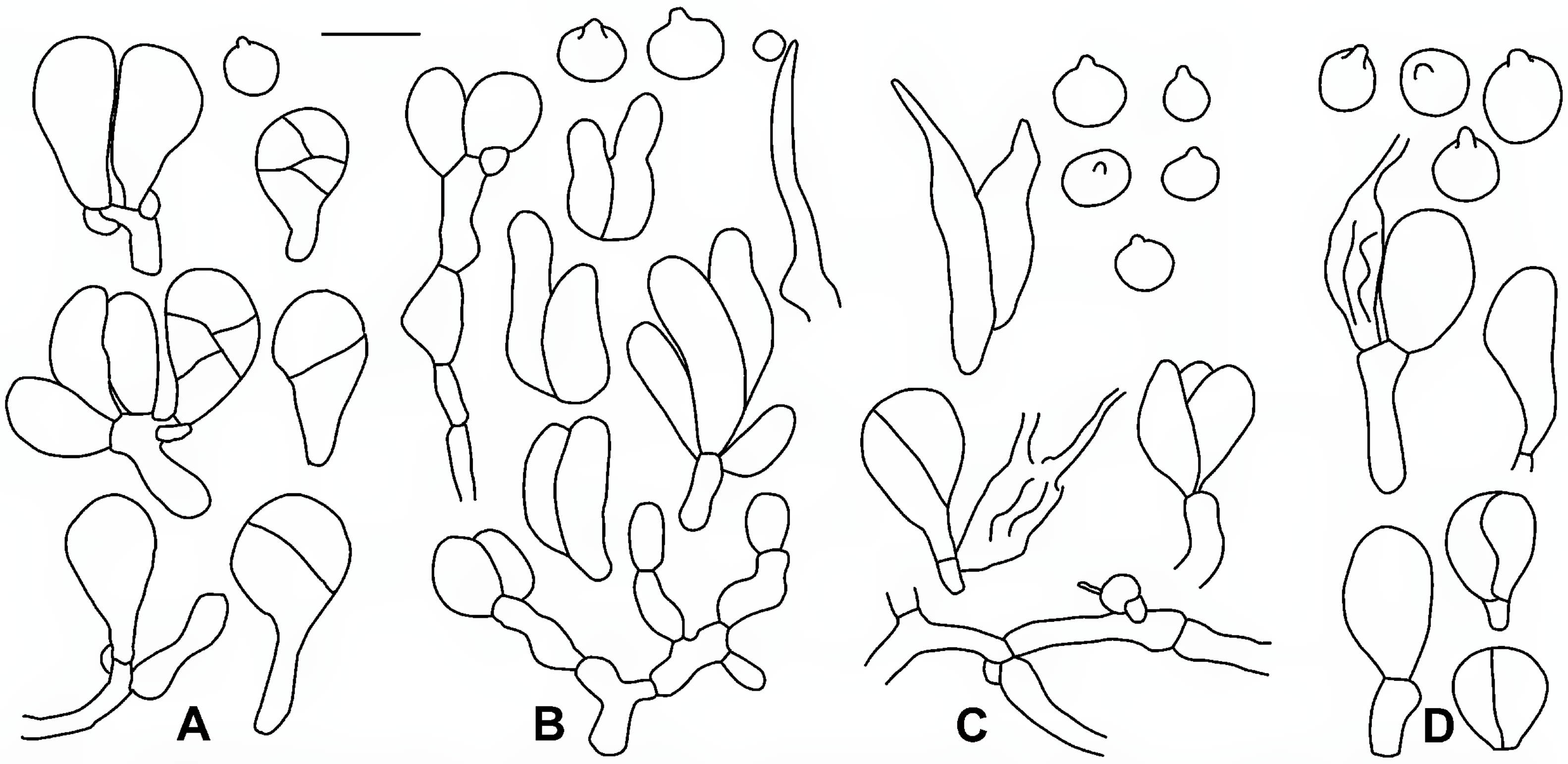

Fig. 4. *Tremella nashii*, basidia, basidiospores and hypha with haustorial branch (A – holotype, B – *Nash 42005*, C – *Nash 27172*, D – *Holien 7110*). Scale bar = 10 µm.

3. *Tremella nashii* Diederich sp. nov., Figs. 3-4.

Basidiomata lichenicola in thallo *Usneae*, pallide ad atrobrunnea, convexa, subglobosa ad elongata, 0.3-2.5 × 0.2-0.7 mm. Hyphidia nulla. Basidia 2-4-cellularia, septis longitudinalibus vel obliquis, 8-20(-24) × 8.5-12 µm. Basidiosporae 5-8 × 4-6 µm. Conidia ignota.

Type: USA. Arizona. Apache Co.: White Mountains, Apache National Forest, Mount Baldy Wilderness, near beginning of trail 94 along W fork of Little Colorado River at Sheep's Crossing, 33°58'N, 109°31'W, 2860 m, on *Usnea sorediifera*, 7.vi.1998, *T.H. Nash III 41941* (asu!, holotype; hb. diederich!, isotype).

Description. - Basidiomata waxy-gelatinous, very pale to sometimes dark brown, convex, subspherical or more often elongate, often irregular in form, 0.3-2.5 × 0.2-0.7 mm; fertile hyphae thick-walled, 2.5-4 µm diam., at least some with clamp connections; haustorial branches present, with clamp connections, mother cell subspherical or ellipsoid, 3.5-4 µm diam., haustorial filament 0.5 µm thick, 1-3 µm long. Hymenium hyaline, containing numerous probasidia; probasidial initials ellipsoid, proliferations occurring through the basal clamp; hyphidia and cystidia absent. Basidia, when mature, 2-4-celled (in some specimens all 2-celled, in others all 4-celled), with longitudinal or oblique septa, subspherical to elongate, often distinctly stalked, 8-20(-24) × 8.5-12 µm; epibasidia subcylindrical, 2-4 µm thick, at least 30 µm long. Basidiospores subspherical to shortly ellipsoid, with a distinct lateral apiculus, 5-8 × 4-6 µm. Anamorph unknown.

Etymology. - Named after Prof. Thomas H. Nash III, collector of all known American specimens of the new species, and main editor of the Sonoran lichen flora.

Hosts. - On the thallus of *Usnea* species, especially *U. hirta* and *U. sorediifera*, commensalistic, frequently accompanied by *Biatoropsis usnearum* and *Lichenostigma maureri*.

Distribution. - Known from Arizona in the USA, where the species appears to be quite common, and probably also from Norway (see below).

Discussion. - This is the fifth species of heterobasidiomycetes known to grow on *Usnea*. *Cystobasidium usneicola* Diederich & Alstrup is easily distinguished by the very distinct basidia consisting of two parts, a lower, thick-walled probasidium and an upper, thin-walled, cylindrical meiosporangium, and basidiospores with a terminal, refractive apiculus. *Biatoropsis usnearum* Räsänen is distinguished by elongate-claviform basidia with transverse septa. *Tremella santessonii* Diederich has also basidia with one transverse septum. *Tremella stevensiana* Diederich was the only known species on *Usnea* with longitudinal basidial septa. That species is distinguished from *T. nashii* by constantly 2-celled basidia, much smaller, applanate to pulvinate basidiomata, 0.1-0.3(-0.5) mm diam., and especially by the presence of abundant conidiophores, located between the basidia, consisting of a 9-21 µm long conidiogenous cell, bearing in the upper part 5-30 ellipsoid conidia.

Three Norwegian specimens appear to be the same species. The basidia are typically tremelloid, with at least one longitudinal septum, 10-16 × 8.5-9.5 µm, and the basidiospores measure 5-8.5 × 5-8 µm. The basidiomata are mainly dark brown and convex with a constricted base. No anamorph has been observed. These specimens are in a relatively poor condition, and I was not able to study the microscopical characters carefully. I include these specimens provisionally within *Tremella nashii*, awaiting the discovery of better developed Scandinavian specimens.

Additional Specimens Examined. - **USA**. Arizona. Apache Co.: same locality as type, on *Usnea hirta*, 1998, *T.H. Nash III 41940* (asu!, hb. diederich!); ibid., 33°57'N, 109°31'30"W, 2900 m, on *U. hirta*, 1994, *T.H. Nash III 34936* (asu!); ibid., first drainage W of the Little Colorado River Valley, 33°58'N, 109°32'W, 2900 m, on *U. hirta*, 1994, *T.H. Nash III 34721* (asu!); ibid., trail from Phelp's cabin along E fork of the Little Colorado River, 109°30'W, 33°56'N, 2900 m, on *U. hirta*, 1990, *B.D. Ryan & T.H. Nash III 27172* (asu!). Coconino Co.: upper part of the W fork of Oak Creek, canyon in the vicinity of West Buzzard Point, 35°01'15"N, 11°50'15"W, 1950 m, on *U. hirta*, 1994, *T.H. Nash III 35351* (asu!). Gila Co.: Gila

National Forest, upper end of Pine Canyon adjacent Coconino Co. border, 34°26'N, 111°24'W, 2235 m, on *U. hirta*, 1998, *T.H. Nash III 42005* (ASU!). GREENLEE CO.: Apache National Forest, Bear Wallow Wilderness, along trail 63, 33°36'N, 109°25'W, 2640 m, on *U. sorediifera*, 1998, *T.H. Nash III 41847* (ASU!); ibid., on *Usnea*, *Nash* 41861 (ASU!); ibid., on *U. hirta*, *T.H. Nash III 41885* (ASU!, HB. DIEDERICH!). **NORWAY**. S-TRØNDELAG: Overhalla, W of Foss in a ravine, on *Usnea*, 1997, *H. Holien 7110* (TRH!, HB. DIEDERICH!); Afjord, N-facing slope along river Skjerva, on *Usnea*, 1997, *H. Holien 7223* (TRH!); Trondheim, Byneset, E of Berg, on *Usnea*, 1997, *H. Holien 7227* (TRH!, HB. DIEDERICH!).

4. *Tremella nieblae* Diederich & van den Boom sp. nov., FIGS. 5-6.

Basidiomata lichenicola in thallo et apotheciorum margine *Nieblae*, gallas brunneas superficiales ad 10 mm diam. efficientia. Hyphidia nulla. Basidia 4-cellularia, septis longitudinalibus vel interdum obliquis, 11-28 × 8.5-15 µm. Basidiosporae 4-5.5(-6.5) × 4-5.5(-6) µm. Conidia ignota.

TYPE: USA. CALIFORNIA. MONTEREY CO.: SSW of Carmel, Point Lobos State Reserve, Bird Island Trail, 121°56'W, 36°28'N, 25 m, on *Niebla cephalota*, 23.vii.2002, *P. van den Boom 29018* (BR!, holotype; HB. DIEDERICH!, HB. VAN DEN BOOM! isotypes).

DESCRIPTION. - Basidiomata indistinct, inducing the formation of large, convex, subspherical or elongate to bullate galls on the host thallus, mostly 0.8-10 mm diam.; gall surface similar to that of the host, but frequently more intensively pigmented, either darker or more orange brown; fertile hyphae 2-4 µm diam., with clamp connections; haustorial branches not observed. Hymenium hyaline, containing numerous probasidia; probasidial initials subspherical, ellipsoid or pyriform, proliferations occurring through the basal clamp; hyphidia and cystidia absent. Basidia, when mature, 4-celled, with longitudinal or rarely oblique septa, some not stalked, others slightly or distinctly stalked, 11-28 × 8.5-15 µm; epibasidia subcylindrical, 2.5-4.5 µm thick, up to at least 30 µm long. Basidiospores subspherical to shortly ellipsoid, with a distinct apiculus, 4-5.5(-6.5) × 4-5.5(-6) µm. Anamorph unknown.

ETYMOLOGY. - Growing on *Niebla*.

HOSTS. - Thallus and apothecial margin of *Niebla* (= *Vermilacinia*) *cephalota* and *N. homalea*, inducing the formation of distinct, relatively large, subspherical or elongate, on *N. homalea* frequently bullate galls, concolorous to the host thallus or slightly darker and more orange brown, otherwise not damaging the host.

DISTRIBUTION. - Obviously very common in California (USA) and in Baja California (Mexico), probably widespread and common in regions where the host genus is common.

DISCUSSION. - Basidiomata of the new species are indistinct, and basidia are immersed and intermixed with host and photobiont hyphae in the cortical layer of strongly convex galls. Young, shiny galls usually contain a small number of basidia that are therefore difficult to observe. Older galls with a roughened surface contain a larger number of mature basidia. Basidiospores are extremely rare in the examined material and only in the type specimen could several spores be observed; the variation of their dimensions should be re-evaluated when more specimens become available. The basidial base is rather variable: in some specimens, most basidia are subspherical, without elongated base, and microscopically they are frequently seen from above with cruciate septa. In other specimens, some or even most basidia have a short to more or less elongate, narrow stalk, and they are generally observed from the side in microscopical preparations. In lateral view, frequently only two cells can be observed, whilst in apical view, almost all basidia are clearly 4-celled.

Specimens with bullate galls are macroscopically similar to *Tremella everniae* Diederich. The new species is distinguished by more elongate, sometimes obliquely septate mature basidia. As furthermore both species have different hosts that are phylogenetically not closely related, it is unlikely that the material on both hosts represents a single variable species. The species is macroscopically and microscopically distinct from both known *Tremella* species confined to *Ramalina*, *T. ramalinae* Diederich and *T. tuckerae*. *Tremella ramalinae* has distinct basidiocarps and basidia are very different (Diederich 1996), although specimens have been observed with a certain number of atypical basidia. *T. tuckerae* (described below) also has distinct basidiocarps, a different type of basidia and much larger basidiospores.

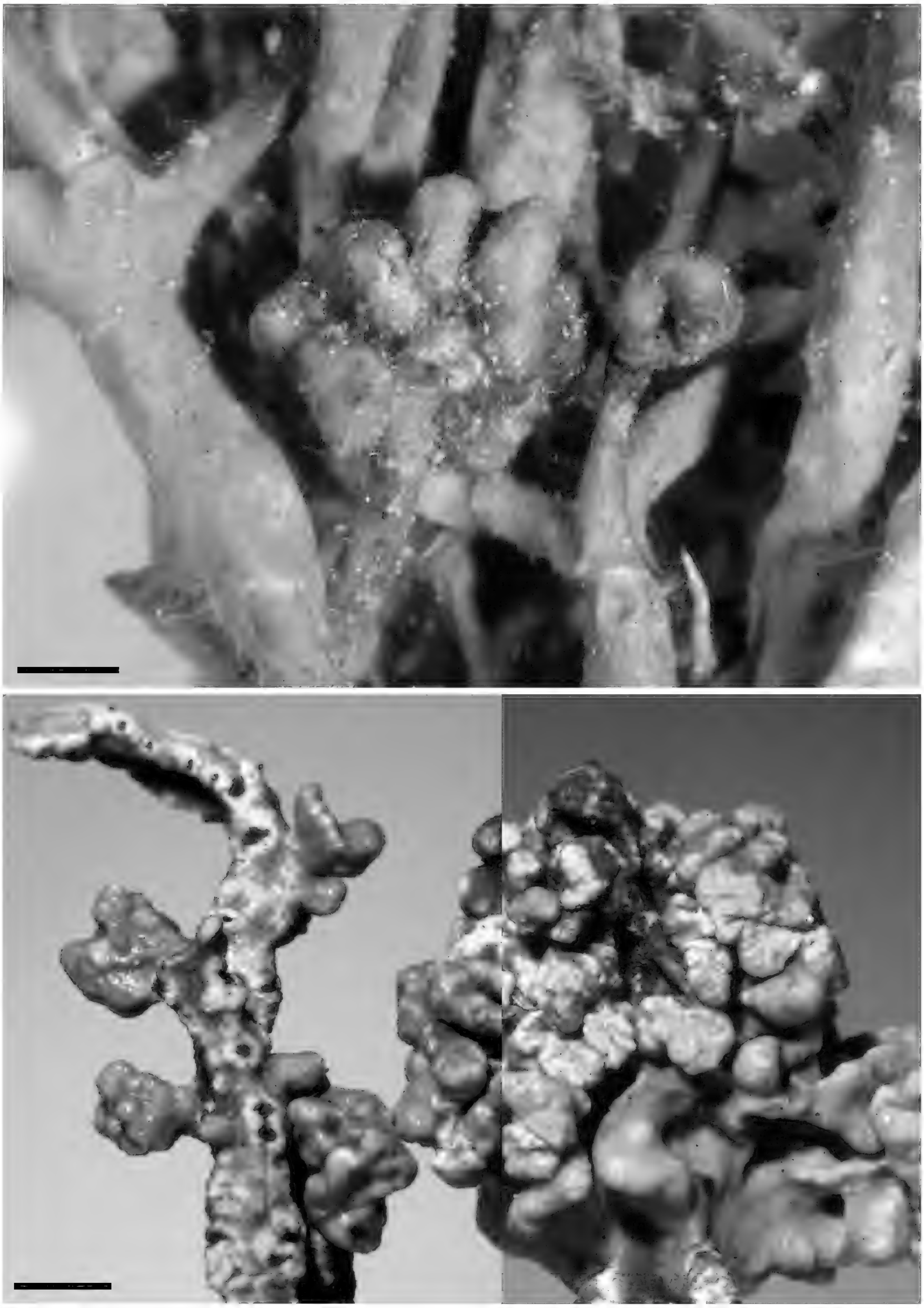

Fig. 5. *Tremella nieblae* (top – holotype, bottom – *Robertson 6545*). Scale bars = 1 mm.

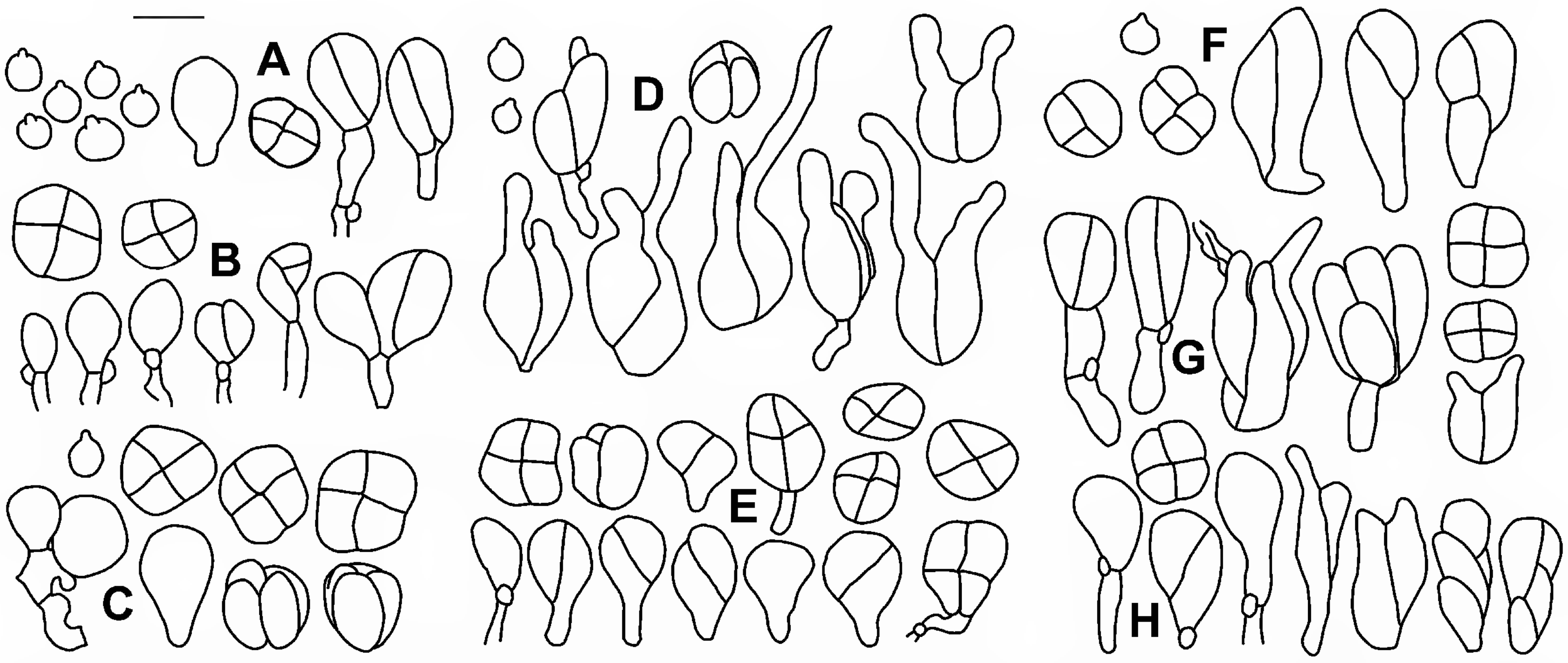

Fig. 6. *Tremella nieblae*, basidia and basidiospores (A – holotype, B – *Cole 7909F*, C – *Tucker 34216B*, D – *Cole 7909*, E – *Wetmore 75724a*, F – *van den Boom 29229*, G – *van den Boom 29474*, H – *van den Boom 29214*). Scale bar = 10 µm.

Diederich (2004) reported *Tremella ramalinae* from California and Baja California on *Ramalina* and *Vermilacinia* species and mentioned the existence of specimens with atypical basidia in which only longitudinal septa occur. The genus *Vermilacinia* is now considered as a synonym of *Niebla* (Bowler & Marsh 2004). These specimens with atypical basidia are all on *Niebla* species and belong to the new *Tremella nieblae*. The genuine *T. ramalinae* on *Ramalina* also exists in California[2] and in Baja California (type specimen).

ADDITIONAL SPECIMENS EXAMINED. – MEXICO. BAJA CALIFORNIA: Punta Santo Tomas SW of Ensenada, on N point along ridge, 31°33'N, 116°41'W, 50 m, on *Niebla cephalota*, 1995, *C.M. Wetmore 75724a* (GZU!). **USA**. CALIFORNIA. HUMBOLDT CO.: Clam Beach State Park, Clam Beach, 14 m, on *N. cephalota*, 2002, *T. Carlberg 569a* (HB. DIEDERICH!); Big Lagoon State Park, N end of Big Lagoon, 39 m, on *N. cephalota*, 2001, *T. Carlberg 531a* (HB. DIEDERICH!). MARIN CO.: Golden Gate National Recreation Area, Fort Cronkhite, rocks in open above Rodeo Beach, 37°50'N, 122°32'W, 33 m, on *N. homalea*, 2001, *M. Cole 7909 & 7909F* (WIS!; HB. DIEDERICH!). MONTEREY CO.: Pacific Grove, S of Ocean View Blvd., near lighthouse and at El Carmelo Cemetery, 121°56'W, 36°38'N, 10 m, on *N. cephalota*, 2002, *P. van den Boom 29229* (herb. van den Boom); ibid., on *N. cephalota*, *P. van den Boom 29211, 29214* (HB. VAN DEN BOOM!, HB. DIEDERICH!); Point sur State Park, Sur School, 44 m, on *N. cephalota*, 2003, *T. Carlberg 934* (HB. DIEDERICH!). SAN LUIS OBISPO CO.: coastal rock outcrops and sea cliffs, near Point Bouchon, Diablo Canyon Power Plant (Pacific Gas & Electric Co.) property, Avila beach, on *N. homalea*, 1995, *S. Tucker 34216B* (SBBG!); S of Morro Bay, State Park road, N of Museum of Natural History, 120°51'W, 35°21'N, 2 m, on *N. cephalota*, 2002, *P. van den Boom 29474* (HB. VAN DEN BOOM!, HB. DIEDERICH!). SONOMA CO.: Chancelor Wetlands, behind stable area, greenstone outcrop in coastal prairie, 38°21'N, 123°03'W, 30 m, on *N. homalea*, 2001, *J. & R. Robertson 6545* (SBBG!, HB. DIEDERICH!).

5. *Tremella tuckerae* Diederich sp. nov., FIGS. 7-8.

Basidiomata lichenicola in thallo *Ramalinae*, gallas brunneas superficiales ad 2 mm diam. efficientia. Hyphidia nulla. Basidia 2-cellularia, septo longitudinali, 12-17 × 10.5-15.5 µm, cellulis maturitate elongatis ad 30 µm longis. Basidiosporae 7.5-9 × 6.5-8 µm. Conidia ignota.

TYPE: USA. NEW MEXICO. BERNALILLO CO.: Sandia Mountains E of Albuquerque along NM route 536, Cibola National Forest, at Sandia Crest, along the North Crest trail No. 130N, 35°12'39"N, 106°26'57"W, 3250 m, on conifers in spruce-fir forest, on *Ramalina sinensis*, 12.viii.2001, *S. Tucker 37335* (SBBG!, holotype; HB. DIEDERICH!, isotype).

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[2] *Tremella ramalinae* Diederich - **USA**. CALIFORNIA. MONTEREY CO.: Pacific Grove, S of Ocean View Blvd., near lighthouse and at El Carmelo Cemetery, 121°56'W, 36°38'N, 10 m, on *Ramalina* sp., 2002, *P. van den Boom 29231* (HB. VAN DEN BOOM!, HB. DIEDERICH!). See also two specimens reported by Diederich (2003).

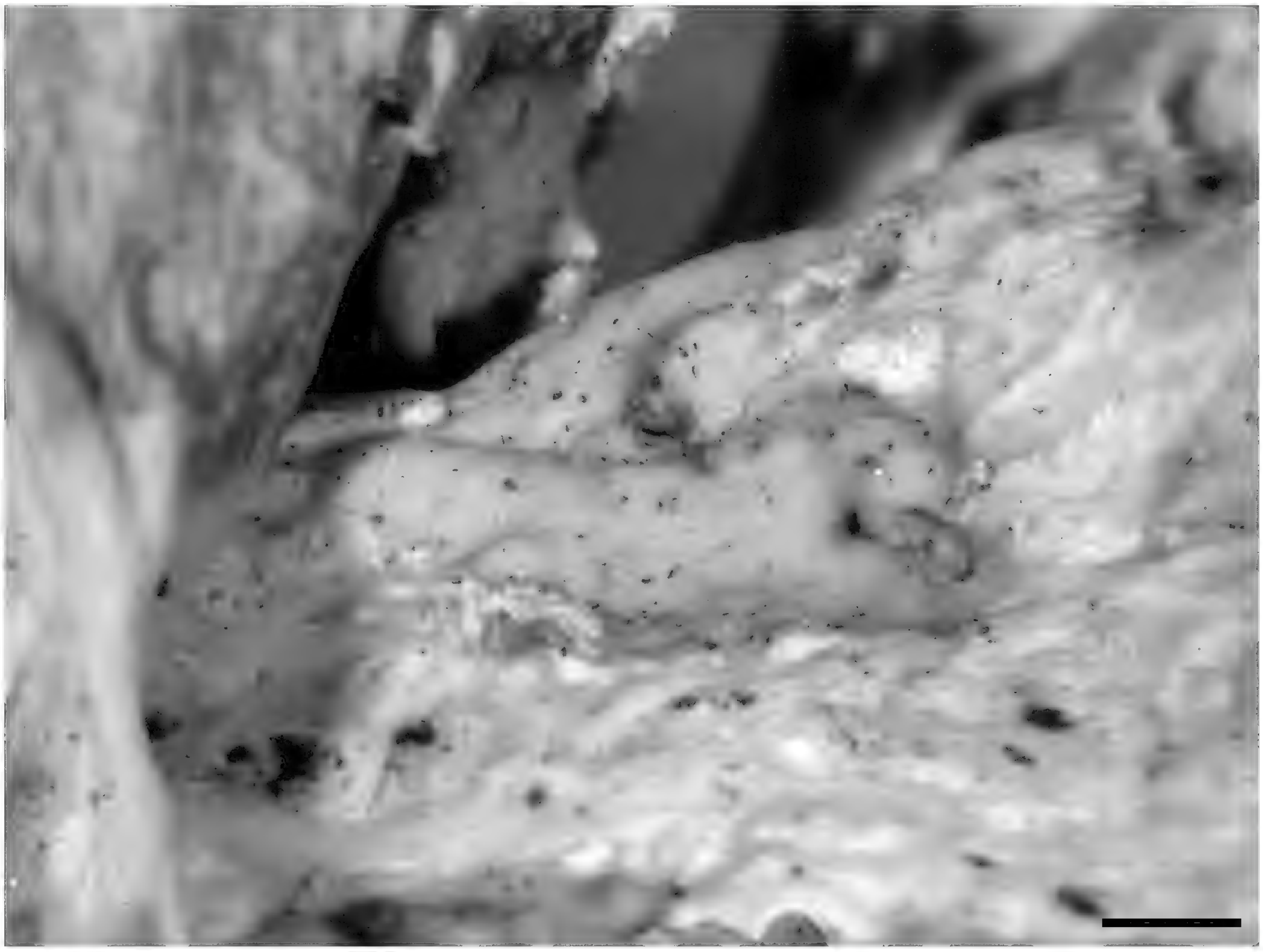

Fig. 7. *Tremella tuckerae* (holotype). Scale bar = 0.5 mm.

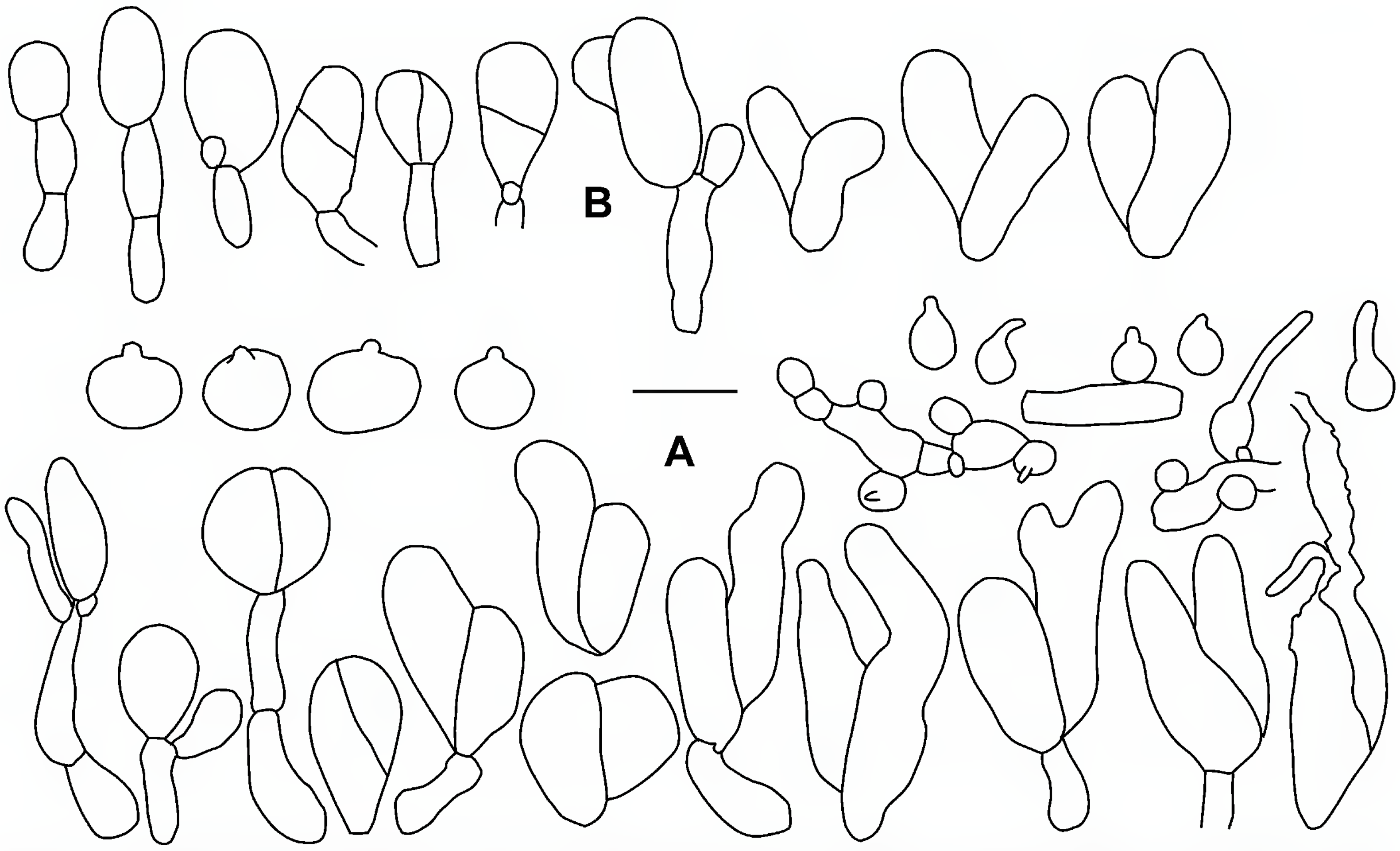

Fig. 8. *Tremella tuckerae*, basidia, basidiospores and hyphae with haustorial branches (A – holotype, B – *O'Dare s.n.*). Scale bar = 10 µm.

Description. - Basidiomata resupinate over thin or thick, often irregular, frequently poor delimited gall-like swellings of the host thallus, waxy-gelatinous, pale brown (more orange brown than the host thallus and therefore easily distinguishable) to blackish (in *R. cuspidata*), 0.3-2 mm diam.; fertile hyphae thick-walled, 2.5-5 µm diam., at least some with clamp connections; haustorial branches present, with clamp connections, mother cell subspherical or ellipsoid, 3.5-5.5 µm diam., haustorial filament 1-1.5 µm thick, up to at least 11 µm long. Hymenium hyaline, containing numerous probasidia; probasidial initials ellipsoid, proliferations occurring through the basal clamp; hyphidia and cystidia absent. Basidia, when mature, 2-celled, with one longitudinal or rarely oblique septum, 10.5-15.5 µm diam., near the septum 12-17 µm long, both cells elongating at maturity, up to 30 µm long (epibasidium not included), in the upper part 4.5-7 µm diam.; epibasidia shrunken in herbarium material, probably subcylindrical and 2-4 µm thick, at least 30 µm long. Basidiospores subspherical to shortly ellipsoid, with a distinct lateral apiculus, (5.5)7.5-9(-11) × (4-)6.5-8 µm. Anamorph unknown.

Etymology. - Named after Prof. Shirley Tucker, collector of the type specimen of the new species.

Hosts. - On the thallus of *Ramalina sinensis*, inducing the formation of flattened to indistinctly cerebriform galls, commensalistic, and at the base of the thallus of *R. cuspidata*, inducing irregular, convex, pale to blackish galls.

Distribution. - So far known from the type locality in New Mexico (USA) and from Ireland.

Discussion. - This species is remarkable by the longitudinally 1-septate basidia in which each cell elongates when mature and becomes much longer than the septum. Two lichenicolous species with similar basidia are known. Basidiomata of *Tremella christiansenii* Diederich induce the formation of brown to dark brown, convex, irregular, often tuberculate or cerebriform galls on the thallus or apothecia of *Physcia* species; basidiospores are distinctly larger, 9-12 × 8.5-10.5 µm, and haustorial cells smaller, 2.5-3 µm diam. *T. hypocenomycis* Diederich has black, irregular, often tuberculate or cerebriform basidiomata, smaller basidiospores, 5.5-6.5 µm diam., and a different host, *Hypocenomyce scalaris*.

The new species is readily distinguished from *Tremella ramalinae*, known from the same host genus, which typically has pyriform, (3-)4-celled basidia with two transverse septa, the upper third divided by one longitudinal septum. Atypical specimens of *T. ramalinae* with many longitudinally septate basidia differ from *T. tuckerae* by the 4-celled basidia of which the individual cells do not elongate at maturity.

Additional Specimen Examined. - **Ireland**: VC H1, South Kerry, Skellig Michael, on *Ramalina cuspidata*, 1988, *O'Dare s.n.* (E!).

6. *Tremella* sp. 7 (on *Flavoparmelia caperata*), Figs. 9-10.

Description. - *Basidiomata* absent; fungus inducing the formation of brownish, strongly convex and bullate galls on the host thallus with a smooth surface, up to 5 mm diam. Probasidial initials ellipsoid, situated in the cortex of the galls. Basidia, when mature, with at least 1 longitudinal septum, some at least 3-celled, c. 14-21(-26) × 10-13 µm. *Basidiospores* with a distinct apiculus, subspherical, c. 4 × 4 µm (one old spore observed). Anamorph unknown.

Host. - *Flavoparmelia caperata*, inducing large galls, but otherwise not damaging the host thallus.

Distribution. - Known from two localities in the USA (North Carolina).

Discussion. - Both collections are relatively rich, but immature. Many young basidia without or with one longitudinal septum have been observed, but they were difficult to study, as they were always obscured by too many surrounding host hyphae. Only one old basidiospore has been seen. For these reasons, the species is left unnamed until better material becomes available. The galls induced by this fungus resemble those of *Tremella everniae*, a species assumed to be confined to *Evernia mesomorpha*.

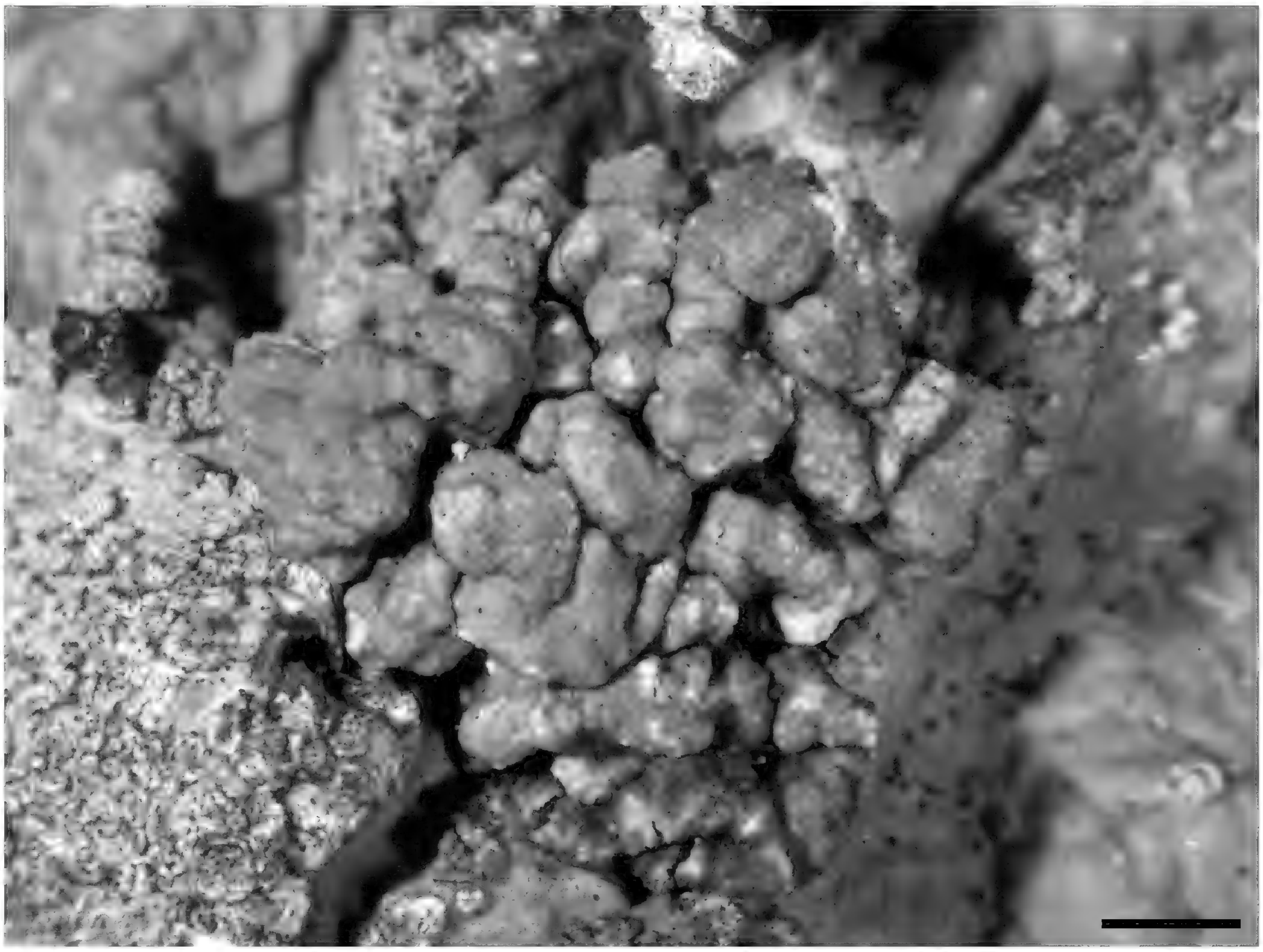

Fig. 9. *Tremella* sp. 7 on *Flavoparmelia caperata* (*Reed 143781A*). Scale bar = 1 mm.

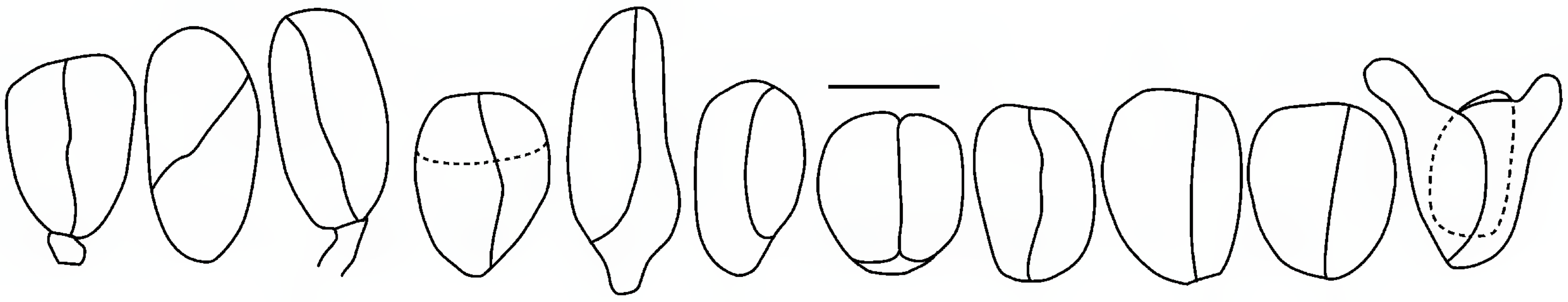

Fig. 10. *Tremella* sp. 7 on *Flavoparmelia caperata*, basidia (*Reed 143781A*). Scale bar = 10 µm.

Specimens Examined. – USA. North Carolina. Ashe Co.: Blue Ridge Parkway, mile 261 just N of Rte 16, Horse Gap, on *Flavoparmelia caperata*, 1982, *C.F. Reed 143781A* (ny!, hb. diederich!). Jackson Co.: Nantahala National Forest, S slope of Piney Ridge Knob, along Forest Service road extension of Moses Creek Road, 11.2 mi ENE of Moses Creek Missionary Baptist Church, 35°21'N, 83°06'W, 1325 m, on *F. caperata*, 1998, *W.R. Buck 34936* (ny!, hb. diederich!).

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Contributions to the Lichen Flora of Maryland: Recent Collections from the Delmarva Peninsula

James C. Lendemer[1] & Wesley M. Knapp[2]

ABSTRACT. – Results of a recent collecting trip to the Delmarva Peninsula in Maryland, USA, are presented. The Delmarva Peninsula (coastal Delaware, Maryland, and Virginia) is the northern limit of the geographic distribution of numerous typical coastal plain species. Lichen checklists for six localities are provided, and 46 taxa are reported for the first time from the state.

Despite the proximity of the Delmarva Peninsula to several major eastern North American cities in which lichenologists have resided, the lichens of the region are poorly known. Biechele (2002) provided the only current checklist of the lower portion of Maryland's Eastern Shore, consisting of seventy-two species. We recently spent several days collecting in the Maryland portion of the Delmarva Peninsula. We visited a number of interesting habitats typical of the Atlantic Coastal Plain of southeastern North America, notable among them being several sand ridges and cypress swamps. Our brief trip to the Delmarva Peninsula resulted in so many interesting lichenological discoveries, especially of taxa apparently at the northern edge of their range, that it is necessary to compile this report. All of the localities visited are managed by the Maryland Department of Natural Resources. This report will begin to fill the large gap in our knowledge of the lichen flora of the Delmarva Peninsula, especially with respect to crustose lichens, as well as provide information that may be helpful in managing these localities.

At present there is no comprehensive specimen-based checklist of Maryland lichens. There is an online literature-based checklist (Uebel and Feuerer 2003), however literature-based checklists are often plagued with incorrect reports from misidentifications and out-of-date taxonomy. As in other reports compiled by the first author, this report is arranged in three parts as follows: checklists for each locality, additions to the checklist of Uebel and Feuerer (2003), and general discussion of the lichen flora of the Delmarva Peninsula and its relation to the rest of Atlantic Coastal Plain in eastern North America.

CHECKLISTS

We present the results of our trip as separate checklists for each State Wildlife Management Area or State Forest, arranged chronologically as they were visited. This is, in part, an effort to make the data available to those responsible for the management of the area. A brief discussion of each locality is also provided in order to place it in the context of the Delmarva Peninsula as a whole. The checklists are arranged alphabetically by genus and species, with unplaced sterile crusts at the end of the list. Lichenicolous fungi are indicated with an asterisk "*" and the identity of the host lichen is provided. Discussions of problematic collections and interesting discoveries are included throughout the lists. The collection numbers are those of the first author (JCL); vouchers of all collections have been deposited in the herbarium of the first author (PH-hbL), with a nearly full set of duplicates in the herbarium of the New York Botanical Garden (NY). Numerous duplicates have also been deposited in the herbarium of the University of California, Riverside (UCR).

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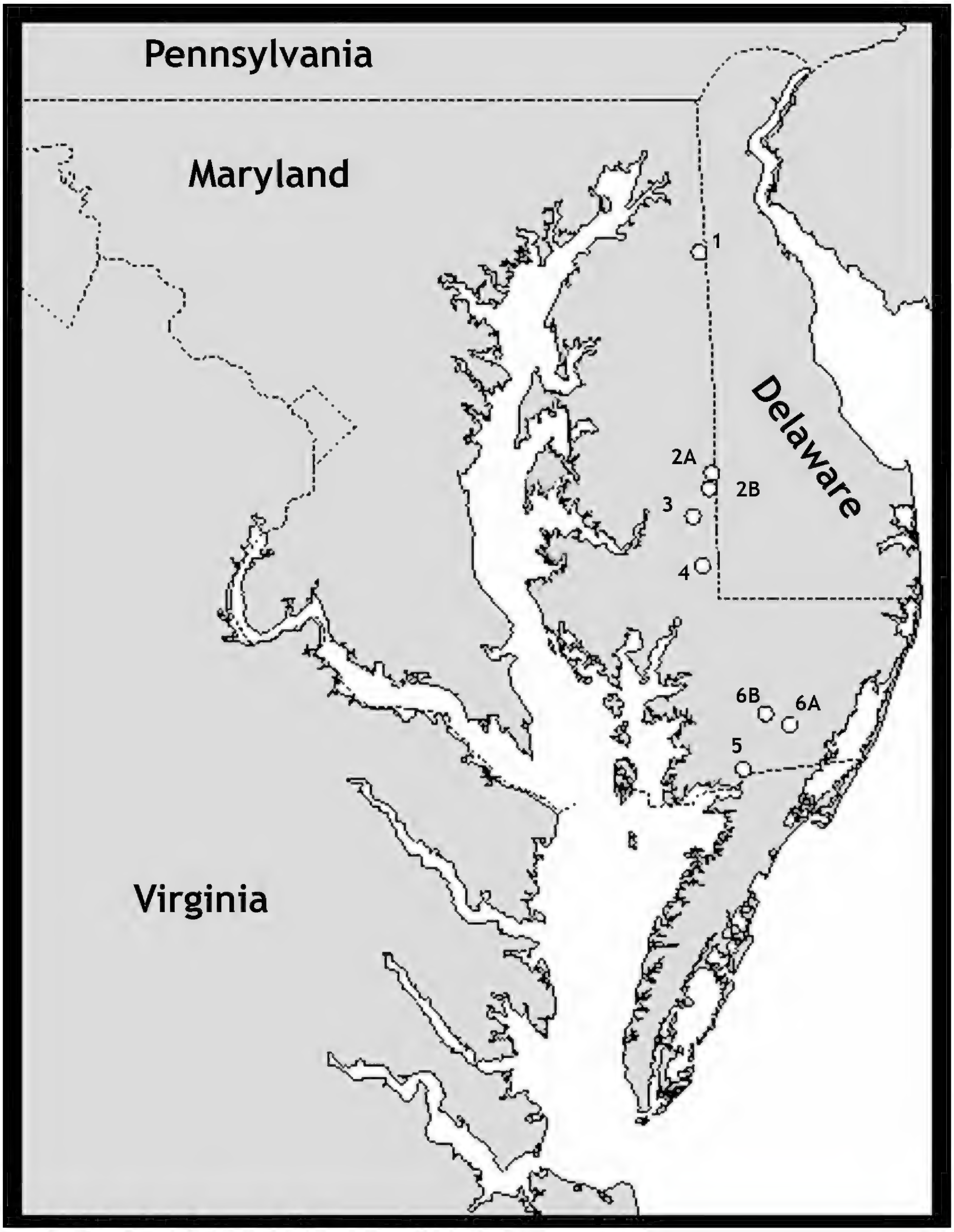

Figure 1. Map of collection sites discussed in this paper.

1. MILLINGTON STATE WILDLIFE MANAGEMENT AREA

Located on the northern portion of the Delmarva Peninsula in Kent Co., Maryland. These seasonally inundated hardwood-dominated forests, generally referred to as wet-woods or flat woods, are typical of the native northern Delmarva forests. They are dominated by *Acer rubrum* L., *Nyssa sylvatica* Marsh., and various oak species (*Quercus* spp.). The dense shrub layer is composed largely of *Vaccinium corymbosum* L. and *Clethra alternifolia* L. and the herbaceous layer is sparse.

USA. MARYLAND. KENT CO.: Millington State Wildlife Management Area, along McKays Corner Road (Maryland Line Road), ~0.3 miles east of Golts, ~3 miles northeast of Massey, Millington Quad. – elev. 75 ft. – Low flatwoods with *Acer rubrum* and *Nyssa.*

Arthonia caesia (Flot.) Körb. – 6195.
Buellia curtisii (Tuck.) Imshaug – *6197.*
Cladonia ochrochlora Flörke – *6192.*
Lecanora hybocarpa (Tuck.) Brodo – *6199.*
Lecanora subpallens Zahlbr. – *6196.*
This taxon does not appear previously to have been reported from the state, and it is likely that most previous reports of *L. caesiorubella* Ach. from the Delmarva Peninsula belong here.
Lecanora thysanophora R.C. Harris – *6185.*
Lepraria aff. *incana* (L.) Ach. – *6184.*
Nadvornikia sorediata R.C. Harris – *6187.*
Parmotrema hypotropum (Nyl.) Hale – *6190.*
Pertusaria paratuberculifera Dibben – *6194.*
Pertusaria pustulata (Ach.) Duby – *6186.*
Phaeophyscia rubropulchra (Degel.) Essl. – 6198.
Punctelia rudecta (Ach.) Krog – 6193.
Pyxine sorediata (Ach.) Mont. – *6191.*
Sterile sorediate crust 1 (atranorin, zeorin) – *6188.*

2 & 3. IDYLWILD STATE WILDLIFE MANAGEMENT AREA AND CHESAPEAKE STATE FOREST

Located on the central-Delmarva Peninsula, this Wildlife Management Area and State Forest is near the northernmost expanse of Late Pleistocene Sand Ridge deposits on the Delmarva. These forested ridges are composed largely of *Pinus rigida* P. Mill., *P. virginiana* P. Mill., *Carya pallida* (Ashe) Engl. & Graebn., and *Quercus falcata* Michx., with typical shrubs consisting of *Vaccinium pallidum* Ait., *Gaylussacia frondosa* (Wangenh.) K. Koch, and *G. baccata* (L.) Torr. & Gray *ex*. Torr.

The two localities visited in the Idylwild State Wildlife Management Area are located in Caroline County. Collections from these two localities have been merged and the localities lettered A, and B. The collection numbers are given following each numbered locality. A checklist of the locality in Dorchester County is provided separately.

A. **USA. MARYLAND. CAROLINE CO.:** Idylwild State Wildlife Management Area, ~1 mile southwest of Smithville, Hickman Quad. – elev. ~40 ft. – Sandpit bordered by mixed hardwood forests (*Acer, Quercus*), former habitation sites with planted trees, and low wet depressions with rotting logs and red maple (*Acer rubrum*).

B. **USA. MARYLAND. CAROLINE CO.:** Idylwild State Wildlife Management Area, ~1 mile west of Route 306, south of Houston Branch, along dirt access road, Seaford West Quad. – elev. 30-40 ft. – Upland mixed hardwood forest of *Carya pallida, Quercus, Acer,* and sparse *Pinus.*.

Amandinea punctata (Hoffm.) Coppins & Scheid. – A: *6239*.
Bacidia schweinitzii (Fr. *ex* E. Michener) A. Schneid. – B: *6266*.
Candelaria concolor (Dicks.) Stein. – B: *6271*.
Canoparmelia caroliniana (Nyl.) Elix & Hale – A: *6222*; B: *6265*.
Canoparmelia crozalsiana (de Lesd.) Elix & Hale – A: *6202*; B: *6529*.
Canoparmelia texana (Tuck.) Elix & Hale – A: *6237*.
Cladonia didyma (Fée) Vainio var. *didyma* – A: *6229*.
Cladonia grayi G. Merr. *ex* Sandst. – A: *6234, 6249*.
Cladonia incrassata Flörke – A: *6233*.
Cladonia macilenta Hoffm. – A: *6207*; B: *6521*.
Cladonia parasitica (Hoffm.) Hoffm. – A: *6245*.
Cladonia polycarpoides Nyl. – A: *6224*.
Cladonia ramulosa (With.) J.R. Laundon – A: *6206*.
Cladonia sobolescens Nyl. *ex* Vainio – A: *6225*.
Cladonia subtenuis (Abbayes) Mattick – A: *6235*.
Heterodermia obscurata (Nyl.) Trevis. – B: *6253*.
Heterodermia speciosa (Wulfen) Trevis. – B: *6255*.
Hypotrachyna livida (Taylor) Hale – A: *6219*.
Lecanora sp. 1 – A: *6200* (fertile), *6231, 6232* (?).

This species was reported from New Jersey by Lendemer (2006) and the collections reported here extend the range southward. *Lendemer 6232* differs from other collections of this species in having a smoother thallus, more discrete soralia with finer soredia, and occurring on lignum.

Lecanora sp. 2 – B: *6252* (fertile?).

Lendemer 6252 is possibly fertile specimen of a sorediate species widespread in eastern North America that contains atranorin and zeorin. There are few apothecia on the collection and it is not clear if they are associated with the sorediate crust.

Lecanora cinereofusca H. Magn. – A: *6228*.
Lecanora minutella Nyl. – A: *6241*.
Lecanora strobilina (Spreng.) Keiffer – A: *6240*.
Lecanora subpallens Zahlbr. – B: *6262*.
Lecidea plebeja Nyl. – B: *6263*.
Lepraria caesiella R.C. Harris – A: *6226*.
Lepraria aff. *incana* (L.) Ach. – A: *6203*.
Lepraria lobificans Nyl. – B: *6256*.
Loxospora pustulata (Brodo & Culb) R.C. Harris – A: *6221*.
Micarea erratica (Körber) Hertel et al. – A: *6220*.
Opegrapha vulgata Ach. – A: *6223, 6236*.
Parmelinopsis horrescens (Taylor) Elix & Hale – A: *6217*.
Parmelinopsis minarum (Vainio) Elix & Hale – A: *6215, 6216*; B: 6272.
Parmotrema hypotropum (Nyl.) Hale – B: *6258*.
Parmotrema subisidiosum (Müll. Arg.) Hale – A: *6242*.
Pertusaria paratuberculifera Dibben – B: *6264*.
Pertusaria subpertusa Brodo – B: *6257*.
Pertusaria texana Müll. Arg. – A: *6230*.
Pertusaria velata (Turner) Nyl. (lichexanthone lacking chemotype) – A: *6214*.
Phaeocalicium polyporaeum (Nyl.) Tibell – A: *6211*.
Phaeographis inusta (Ach.) Müll. Arg. – B: *6268*.
Phaeophyscia rubropulchra (Degel.) Essl. – A: *6244*.
Physcia americana G. Merr. – B: *6261*.
Physcia millegrana Degel. – A: *6247*.
Physcia pumilior R.C. Harris – A: *6204*.
Placynthiella sp. – A: *6246*.
Placynthiella uliginosa (Schrad.) Coppins & P. James – A: *6250*.
Pseudosagedia cestrensis (Tuck. *ex* E. Michener) R.C. Harris – A: *6210*; B: 6260.

Punctelia missouriensis G. Wilh. & Ladd – A: *6248.*
Pyrenula pseudobufonia (Rehm) R.C. Harris – B: *6267.*
Pyrrhospora varians (Ach.) R.C. Harris – A: *6213*; B: *6269.*
Pyxine sorediata (Ach.) Mont. – A: *6209*
Ramonia microspora Vězda – A: *6218, 3243.*
Scoliciosporum chlorococcum (Graewe ex Stenh.) Vězda – A: *6238.*
Trapeliopsis flexuosa (Fr.) Coppins & P. James – A: *6208.*
Usnea pensylvanica Motyka – A: *6212.*
Usnea subscabrosa Nyl. *ex* Motyka – A: *6205.*
Sterile isidiate crust – B: *6270.*

> This taxon is abundant on the Delmarva Peninsula, and is known farther south from North Carolina.

Sterile sorediate crust 2 (perlatolic acid group unknown) – A: *6201.*
Sterile sorediate crust 3 (xanthone?) – A: *6227.*

> The above collection is corticolous and has some resemblance to *Biatora pontica* Printzen & Tønsberg, which is also KC+ yellow-orange. Our collection is sterile, and appears chemically discordant with *B. pontica* in containing only a xanthone.

USA. Maryland. Dorchester Co.: Chesapeake State Forest, ~2.5 miles southwest of Federalsburg, along Tara Road, Federalsburg Quad. – elev. 5-35 ft. – Disturbed sandy roadside in pine (*Pinus*) plantation and mixed hardwood forest (*Acer, Quercus, Carya*).

Buellia curtisii (Tuck.) Imshaug – *6281.*
Candelariella reflexa (Nyl.) Lettau – *6288.*
Cladonia grayi G. Merr. *ex* Sandst. – *6277.*
Cladonia macilenta Hoffm. var. *bacillaris* (Genth.) Schaer. – *6273, 6276, 6279.*
Cladonia polycarpia G. Merr. – *6274.*
Cladonia subtenuis (Abbayes) Mattick – *6278.*
Lepraria lobificans Nyl. – *6275.*
Opegrapha vulgata Ach. – *6287.*
Peltigera praetextata (Flörke *ex* Sommerf..) Vainio – *6289.*
Trapeliopsis flexuosa (Fr.) Coppins & P. James – *6280.*

4. Sharptown Dunes

Located on the mid-Delmarva Peninsula, this Sand Ridge is composed largely of Evesboro Sands and is dominated by *Pinus virginiana* with infrequent *Quercus* spp. The understory is nearly absent and composed largely of *Gaylussacia baccata* and *Vaccinium pallidum.*

USA. Maryland. Wicomico Co.: Sharptown Dunes, ~1.2 miles northeast of Hollering Point, ~1 mile southwest of Sharptown, along east shore of the Nanticoke River, Sharptown Quad. – elev. 5-20 ft. – Sand ridge complex densely forested with *Pinus virginiana* and sparse *Carya* and *Quercus*, small relict openings with mixed hardwoods (*Acer, Carya, Quercus*) and wet areas with *Ilex opaca.*

Anisomeridium polypori (Ellis & Everh.) M.E. Barr – *6296.*
Bacidia schweinitzii (Fr. *ex* E. Michener) A. Schneid. – *6312.*
Buellia stillingiana J. Steiner – *6298.*
Canoparmelia caroliniana (Nyl.) Elix & Hale – *6294, 6310, 6315.*
Cladonia subtenuis (Abbayes) Mattick - *7114.*
Flavoparmelia caperata (L.) Hale – *6300.*
Heterodermia obscurata (Nyl.) Trevis. – *6319.*

Hypotrachyna livida (Taylor) Hale – *6305.*
Hypotrachyna osseoalba (Vainio) Park & Hale – *6307, 6309.*
Lecanora hybocarpa (Tuck.) Brodo – *6297.*
Lecanora subpallens Zahlbr. – *6317.*
Lepraria caesiella R.C. Harris – *6291.*
Loxospora pustulata (Brodo & Culb.) R.C. Harris – *6316.*
Minutoexcipula mariana V. Atienza* (on *Pertusaria*) – *6299.*
Opegrapha vulgata Ach. – *6304.*
Parmelinopsis horrescens (Taylor) Elix & Hale – *6313, 6320.*
Parmeliopsis subambigua Gyeln. – *6308.*
Parmotrema hypoleucinum (J. Steiner) Hale – *6292.*
Parmotrema submarginale (Michx.) DePriest & B.W. Hale – *6218.*
Parmotrema hypotropum (Nyl.) Hale – *6290.*
Phaeocalicium polyporaeum (Nyl.) Tibell – *6322.*
Phaeographis inusta (Ach.) Müll. Arg. – *6302.*
Pseudosagedia raphidosperma (Müll. Arg.) R.C. Harris – *6295*
Punctelia subrudecta auct. Amer. – *6306.*
Pyxine sorediata (Ach.) Mont. – *6314.*
Schismatomma glaucescens (Nyl. *ex* Willey) R.C. Harris – *6304.*
Trypethelium virens Tuck. *ex* E. Michener – *6301.*
Tuckermanopsis americana (Sprengel) Hale – *6321.*
Usnea subscabrosa Nyl. *ex* Motyka – *6293.*
Sterile isidiate crust – *6311.*

5. Hickory Point Cypress Swamp

Located on the southern Delmarva Peninsula along the Pocomoke River, this southern-affinity Cypress Swamp is near the northern extreme of its range. Located in this swamp are many southern species considered rare in Maryland. The canopy is composed of various *Quercus* spp., *Acer rubrum*, *Taxodium distichum* (L.) L.C. Rich., and *Chamaecyparis thyoides* (L.) B.S.P. Understory trees and shrubs consist of *Persea palustris* (Raf.) Sarg., *Vaccinium corymbosum*, *Magnolia virginiana* L. *Ilex opaca* Ait. and *Itea virginica* L.

USA. Maryland. Worcester Co.: Hickory Point Cypress Swamp, along Hickory Point Road, east shore of the Pocomoke River, ~2 miles northeast of Cedar Hall, Kingston Quad. – elev. 0-10 ft. – Extensive cypress (*Taxodium*) swamp with *Magnolia, Acer, Ilex,* and *Chamaecyparis* and bordered by upland mixed hardwood forests of *Pinus, Quercus, Carya,* and *Acer*.

Arthonia rubella (Fée) Nyl. – *6365, 6378.*
Bacidia sp. – *6369.*
Bacidia schweinitzii (Fr. *ex* E. Michener) A. Schneid. – *6324, 6328.*
Bacidina egenula (Nyl.) Vězda – *6331.*
Brigantiaea leucoxantha (Spreng.) R. Sant. & Hafellner – *6371.*
Byssoloma meadii (Tuck.) S. Ekman – *6344, 6359.*
Byssoloma leucoblepharum Vainio – *6327, 6367.*
Chrysothrix candelaris (L.) J.R. Laundon – *6345.*
Chrysothrix flavovirens Tønsberg *s. lat.* – *6355* (*Chamaecyparis thysoides*), *6361* (*Pinus*).
See Harris & Lendemer (2005) for a discussion of the use of this name for North American material. In the material so far seen by the author *C. flavovirens* has been confined to conifers and *C. candelaris* to hardwoods (*Acer*). All previous reports of *C. candelaris* need to be restudied.
Coenogonium pineti (Ach.) Lücking & Lumbsch – *6357.*
Dactylospora inquilina Hafellner* (on *Pertusaria paratuberculifera*) – *6347.*

Fissurina insidiosa Hook. & C. Knight – *6358.*
Lecanora sp. 2 – *6334.*
Lecanora cinereofusca H. Magn. – *6341.*
Lecanora hybocarpa (Tuck.) Brodo – *6362.*
Lecanora thysanophora R.C. Harris – *6368.*
Leptogium cyanescens (Rabenh.) Körber – *6343.*
Lichenoconium erodens M.S. Christ. & D. Hawksw.* (on *Lecanora cinereofusca*) – *6348.*
Lobaria quercizans Michx. – *6373.*
Myelochroa aurulenta (Tuck.) Elix & Hale – *6372.*
Nadvornikia sorediata R.C. Harris – *6350.*
Ochrolechia pseudopallescens Brodo – *6330.*
Opegrapha sp. ? – *6323.*

> This taxon, also known from the Ozarks, is a sorediate species with gyrophoric acid, easily overlooked in the field. Our collection is sterile.

Opegrapha viridis Pers. – *6366.*
Parmelinopsis minarum (Vainio) Elix & Hale – *6375.*
Parmotrema perforatum (Jacq.) A. Massal. – *6337.*
Parmotrema subisidiosum (Müll. Arg.) Hale – *6370.*
Parmotrema submarginale (Michx.) DePriest & B.W. Hale – *6335.*
Pertusaria epixantha R.C. Harris – *6340, 6351.*
Pertusaria multipunctoides Dibben – *6332.*
Pertusaria ophthalmiza (Nyl.) Nyl. – *6333.*
Pertusaria paratuberculifera Dibben – *6329, 6377.*
Pertusaria velata (Turner) Nyl. (lichexanthone lacking chemotype) – *6364.*
Phlyctis ludoviciensis (Müll. Arg.) Lendemer – *6339.*
Physcia americana G. Merr. – *6342.*
Porina heterospora (Fink *ex* J. Hedrick) R.C. Harris – *6354.*
Punctelia rudecta (Ach.) Krog – *6374.*
Pyrenula pseudobufonia (Rehm) R.C. Harris – *6326.*
Pyrenula punctella Trevis. – *6346.*
Pyrrhospora varians (Ach.) R.C. Harris – *6363.*
Thelidium minutulum Körber – *6325.*
Thelotrema subtile Tuck. – *6356.*
Trypethelium virens Tuck. *ex* E. Michener – *6360.*
Usnea subscabrosa Nyl. *ex* Motyka – *6336.*
Sterile isidiate crust – *6349.*
Sterile sorediate crust 5 (atranorin) – *6338.*

> This species is widely distributed in the mid-Atlantic states and has been reported from New Jersey (Lendemer 2006) and Pennsylvania (Harris & Lendemer 2005). The green corticolous/muscicolous thallus is often found near the bases of trees and the diffuse green soralia are rather distinctive.

Sterile sorediate crust 6 (atranorin) – *6352.*
Sterile sorediate crust 7 (atranorin, terpenoids) – *6353.*

6. Pocomoke State Forest

We visited two localities in Pocomoke State Forest. The localities are numbered A and B and the collection numbers follow the locality number. The cypress swamp is likely part of the area from which the records mentioned by Biechele (2002) are derived. It is interesting that we did not recollect all of the taxa mentioned by Biechele, and that we discovered a number of additional interesting macrolichens at the locality.

The first locality is on the southern Delmarva Peninsula near the mouth of Corbin Branch at the Pocomoke River. This tidally influenced freshwater Riverine Cypress Swamp supports an interesting mix of southern vascular plants and bryoflora. The swamp is characterized by *Taxodium distichum* and scattered *Acer rubrum*, *Ilex opaca*, and *Fraxinus profunda* (Bush) Bush.

The second locality, also on the southern Delmarva Peninsula, is a sand ridge characterized by soils of the Rutlage and Lakeland Formations. This sand ridge is significantly different than others on the Peninsula in being dominated by *Pinus echinata* P. Mill. Other species located in this forest are *Carya pallida, Pinus serotina* Michx., and various oak species, including *Quercus marilandica* Muenchh. and *Q. nigra* L..

A. - **USA. Maryland. Worcester Co.:** Pocomoke State Forest, along Corbin Branch where it enters the Pocomoke River, ~1 mile northwest of Milburn Landing, Snow Hill Quad. – elev. 0 ft. – Tidal freshwater cypress swamp with large *Taxodium*, and mixed hardwoods (*Acer, Nyssa, Carpinus*).

B. - **USA. Maryland. Worcester Co.:** Pocomoke State Forest, just north of Red House Road, ~0.5 miles west of Nassawango Creek, Snow Hill Quad. – elev. 50 ft. - Open sand ridge in pine (*Pinus*) – oak (*Quercus*) forest with sparse hickory (*Carya*).

Anzia americana Yoshim. & Sharp – A: *6431.*
Anzia colpodes (Ach.) Stizenb. – A: *6396, 6419.*
Arthonia rubella (Fée) Nyl. – A: *6417.*
Arthothelium interveniens (Nyl.) Zahlbr. – A: *6437.*
Bacidia schweinitzii (Fr. *ex* E. Michener) A. Schneid. – A: *6406* (pigment deficient), *6421.*
Bathelium carolinianum (Tuck.) R.C. Harris – A: *6423.*
Brigantiaea leucoxantha (Spreng.) R. Sant. & Hafellner – A: *6422.*
Buellia vernicoma Tuck. – A: *6403.*
Byssoloma meadii (Tuck.) S. Ekman – A: *6394, 6438.*
Byssoloma leucoblepharum Vainio – A: *6408, 6441.*
Calicium salicinum Pers. – B: *6454.*
Canoparmelia caroliniana (Nyl.) Elix & Hale – B: *6453.*
Cladonia incrassata Flörke – A: *6397.*
Cladonia squamosa Hoffm. – A: *6427.*
Coenogonium luteum (Dicks.) Kalb & Lücking – A: *6392.*
Cresponea sp. – A: *6435.*
Fissurina insidiosa Hook. & C. Knight – A: *6393.*
Heterodermia speciosa (Wulfen) Trevis. – B: *6451.*
Hypotrachyna livida (Taylor) Hale – A: *6420.*
Lecanora cinereofusca H. Magn. – A: *6387.*
Lecanora hybocarpa (Tuck.) Brodo – A: *6404.*
Lepraria sp. – A: *6415.*
Leptogium cyanescens (Rabenh.) Körber – A: *6395.*
Myelochroa aurulenta (Tuck.) Elix & Hale – A: *6425, 6434.*
Nadvornikia sorediata R.C. Harris – A: *6385, 6386.*
Opegrapha varia Pers. – B: *6444.*
Parmelia squarrosa Hale – A: *6390.*
Parmelinopsis horrescens (Taylor) Elix & Hale – B: *6447.*
Parmeliopsis subambigua Gyelnik – B: *6450.*
Parmotrema hypoleucinum (J. Steiner) Hale – B: *6452.*
Parmotrema hypotropum (Nyl.) Hale – A: *6384.*
Parmotrema subisidiosum (Müll. Arg.) Hale – A: *6400, 6401, 6414*
Parmotrema submarginale (Michx.) DePriest & B.W. Hale – A: *6413.*
Parmotrema xanthinum (Müll. Arg.) Hale – A: *6383, 6426.*
Pertusaria paratuberculifera Dibben – A: *6436.*
Pertusaria propinqua Müll. Arg. – A: *6402, 6439.*

Pertusaria subpertusa Brodo – A: *6388.*
Pertusaria velata (Turner) Nyl. (lichexanthone lacking chemotype) – B: *6445.*
Phaeocalicium polyporaeum (Nyl.) Tibell – A: *6409.*
Porina heterospora (Fink *ex* J. Hedrick) R.C. Harris – A: *6405, 6424.*
Punctelia rudecta (Ach.) Krog – B: *6446.*
Pyrenula punctella Trevis. – A: *6418.*
Pyrrhospora varians (Ach.) R.C. Harris – A: *6416.*
Tephromela atra (Huds.) Hafellner – A: *6433.*
Thelotrema monospermum R.C. Harris – A: *6389.*

> Among the coastal plain species reaching their northern limit in Delmarva, perhaps *T. monospermum* is the most interesting. It was described from Florida (Harris 1990), and has not previously been found farther north (the report from North Carolina by Lendemer & Yahr (2004) was based on a misidentification).

Thelotrema subtile Tuck. – A: *6391, 6410.*
Usnea pensylvanica Motyka – A: *6398.*
Usnea strigosa (Ach.) A. Eaton – A: *6411, 6412, 6429*
Usnea subscabrosa Nyl. *ex* Motyka – A: *6382.*
Usnea trichodea Ach. – A: *6399, 6432.*
Lichenicolous fungus* (on *Pyrrhospora varians*) – A: *6430.*

> The above collection is lichenicolous on the thallus of *Pyrrhospora varians* and the ascus type is similar to that of *Strangospora* (*fide* R.C. Harris), the asci are polysporous, and ascospores simple, hyaline 4.5-5.2 x 3-3.5µm.

Sterile isidiate crust – A: *6407.*
Sterile sorediate crust 4 (lecanoric acid) – A: *6428, 6440.*

NEW REPORTS FOR MARYLAND

Using the checklist of Uebel & Feuerer (2003) as a baseline, we report the following taxa for the first time from the state of Maryland.

Anzia americana Yoshim. & Sharp
Arthonia rubella (Fée) Nyl.
Arthothelium interveniens (Nyl.) Zahlbr.
Bacidina egenula (Nyl.) Vězda
Bathelium carolinianum (Tuck.) R.C. Harris
Buellia vernicoma Tuck.
Byssoloma leucoblepharum (Nyl.) Vainio
Byssoloma meadii (Tuck.) S. Ekman
Candelariella reflexa (Nyl.) Lettau
Chrysothrix candelaris (L.) J.R. Laundon
Chrysothrix flavovirens Tønsberg *s. lat.*
Cladonia ochrochlora Flörke
Cladonia polycarpia G. Merr.
Cladonia ramulosa (With.) J.R. Laundon
Cladonia sobolescens Nyl. *ex* Vainio
Coenogonium luteum (Dicks.) Kalb & Lücking
Coenogonium pineti (Ach.) Lücking & Lumbsch
Cresponea sp.
Dactylospora inquilina Hafellner*
Fissurina insidiosa Hook. & C. Knight
Lecanora cinereofusca H. Magn.

Lecanora minutella Nyl.
Lecanora subpallens Zahlbr.
Lecanora thysanophora R.C. Harris
Lepraria caesiella R.C. Harris
Lepraria aff. *incana* (L.) Ach.
Lepraria lobificans Nyl.
Lichenoconium erodens M.S. Christ. & D. Hawksw.*
Loxospora pustulata (Brodo & Culb) R.C. Harris
Minutoexcipula mariana V. Atienza*
Nadvornikia sorediata R.C. Harris
Opegrapha vulgata Ach.
Phaeocalicium polyporaeum (Nyl.) Tibell
Phaeographis inusta (Ach.) Müll. Arg.
Phlyctis ludoviciensis (Müll. Arg.) Lendemer
Physcia pumilior R.C. Harris
Pseudosagedia raphidosperma (Müll. Arg.) R.C. Harris
Punctelia missouriensis G. Wilh. & Ladd
Ramonia microspora Vězda
Schismatomma glaucescens (Nyl. *ex* Willey) R.C. Harris
Thelidium minutulum Körber
Thelotrema monospermum R.C. Harris
Thelotrema subtile Tuck.
Tuckermanopsis americana (Sprengel) Hale
Usnea pensylvanica Motyka
Usnea subscabrosa Nyl. *ex* Motyka

Discussion

The lichen flora of the Delmarva Peninsula is of considerable interest because the peninsula itself is geologically younger than the adjacent portions of the Inner Coastal Plain in Maryland and Virginia. Thus the land became available for colonization by terrestrial life after surrounding portions of the coastal plain. Since the terrestrial flora of the peninsula is younger than that of the surrounding coastal plain the composition of the vascular plant flora, and the distribution and frequency of some vascular plant species on the Peninsula differ significantly from other seemingly identical areas at comparable latitudes of the coastal plain. The geologic formations of the Coastal Plain west of the Chesapeake Bay, in descending percent of landmass, are from the Cretaceous, Tertiary: Pliocene, Tertiary: Miocene through Paleocene, and Quaternary formations (Schmidt 1992). The geologic formations of Maryland's Eastern Shore are markedly younger and are, in descending percent of landmass, from the Quaternary, Tertiary: Pliocene, Cretaceous, and Tertiary: Miocene through Paleocene formations (Schmidt 1992). These geologic differences may be the reason for the vegetative differences of these coastal areas, which are found at the same latitude. East of the Chesapeake Bay species that are frequent or common such as *Taxodium distichum, Alnus maritima* (Marsh.) Muhl. ex Nutt., *Symplocos tinctoria* (L.) L'Her., *Pityopsis graminifolia* (Michx.) Nutt., and *Pinus serotina* Michx. are rare or absent. The peninsula also hosts the northernmost occurrences of several habitats more typical of the southern coastal plain, most notable among these being extensive cypress swamps, two of which we visited.

The lichen flora of the Delmarva Peninsula clearly shows that the region is part of the transition zone between the southern and northern coastal plain, both hosting an assemblage of lichen taxa with an affinity to one or the other area (Brodo 1968, Lendemer 2006). Within eastern North America the coastal plain can be divided into two distinct subunits, one with a primarily tropical element and one with a primarily temperate/boreal element. The portion of the costal plain extending from Long Island, New York through southern New Jersey and the southern portion of the Delmarva Peninsula is essentially the transition zone between these two major subunits of the coastal plain, a conclusion supported by Beaven & Oosting (1939).

The Delmarva Peninsula and adjacent southern New Jersey are significant in having many taxa at the northern or southern edge of their ranges within the coastal plain. The following taxa found on the Delmarva Peninsula fall into this category (taxa marked with a dagger have their northernmost record from southern New Jersey): *Anzia americana, Arthonia rubella, Arthothelium interveniens, Bathelium carolinianum, Brigantiaea leucoxantha, Byssoloma meadii, B. leucoblepharum, Candelariella reflexa*†, *Canoparmelia caroliniana, C. texana, Cresponea sp., Fissurina insidiosa*†, *Hypotrachyna osseoalba*†, *Opegrapha viridis, Parmelinopsis horrescens*†, *Parmotrema submarginale, P. xanthinum, Pertusaria epixantha, Phlyctis ludoviciensis, Porina heterospora, Pyrenula punctella, Ramonia microspora*, *Thelotrema monospermum*. Perhaps the most striking discovery was a population of *Thelotrema monospermum* in Pocomoke State Forest.

The distribution of some species within the coastal plain (and eastern North America) essentially follows the distribution of their typical substrates. On the Delmarva Peninsula two such taxa are *Lecanora minutella* with *Pinus rigida* and *Trypethelium virens* with *Ilex opaca*. Several species found in and north of southern New Jersey were also conspicuously absent from the Delmarva Peninsula; these include *Biatora longispora* and *B. printzenii*. As discussed by Lendemer (2006), the lichens of the coastal plain in North America, especially with respect to the crustose taxa, are very poorly known, and discoveries continue to be made, even in areas purported to be well studied.

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APPENDIX

Table 1. Primary substrates for taxa. L = lichenicolous; L/M = lignicolous/muscicolous; S = saxicolous; T = terricolous; C = conifer; H = hardwood; O = other.

Taxon	L	L/M	S	T	C	H	O
Amandinea punctata						x	
Anisomeridium polypori						x	
Anzia americana						x	
Anzia colpodes						x	
Arthonia caesia						x	
Arthonia rubella						x	
Arthothelium interveniens						x	
Bacidia schweinitzii						x	
Bacidina egenula			x				
Bathelium carolinianum						x	
Brigantiaea leucoxantha						x	
Buellia curtisii						x	
Buellia vernicoma						x	
Buellia stillingiana						x	
Byssoloma meadii						x	
Byssoloma leucoblepharum						x	
Calicium salicinum		x					
Candelaria concolor						x	
Candelariella reflexa						x	
Canoparmelia caroliniana					x		
Canoparmelia crozalsiana						x	
Canoparmelia texana						x	
Chrysothrix candelaris						x	
Chrysothrix flavovirens					x		
Cladonia didyma		x					
Cladonia grayi		x		x			
Cladonia incrassata		x		x	x		
Cladonia macilenta		x			x		
Cladonia ochrochlora		x				x	
Cladonia parasitica		x					

Table 1. *Continued.*

Taxon	L	L/M	S	T	C	H	O
Cladonia polycarpia				x			
Cladonia polycarpoides				x			
Cladonia ramulosa		x					
Cladonia sobolescens				x			
Cladonia squamosa					x		
Cladonia subtenuis				x			
Coenogonium luteum						x	
Coenogonium pineti		x					
Cresponea sp.					x		
Dactylospora inquilina	x						
Fissurina insidiosa						x	
Flavoparmelia caperata						x	
Heterodermia obscurata						x	
Heterodermia speciosa						x	
Hypotrachyna livida						x	
Hypotrachyna osseoalba					x		
Lecanora sp. 1		x(?)				x	
Lecanora sp. 2						x	
Lecanora cinereofusca						x	
Lecanora hybocarpa						x	
Lecanora minutella					x		
Lecanora strobilina						x	
Lecanora subpallens						x	
Lecanora thysanophora						x	
Lecidea plebeja		x					
Lepraria sp.						x	
Lepraria caesiella						x	
Lepraria aff. incana						x	

Table 1. *Continued.*

Taxon	L	L/M	S	T	C	H	O
Lepraria lobificans						x	
Leptogium cyanescens						x	
Lichenoconium erodens	x						
Lobaria quercizans						x	
Loxospora pustulata						x	
Micarea erratica			x				
Minutoexcipula mariana	x						
Myelochroa aurulenta						x	
Nadvornikia sorediata						x	
Ochrolechia pseudopallescens						x	
Opegrapha sp.						x	
Opegrapha varia						x	
Opegrapha viridis						x	
Opegrapha vulgata						x	
Parmelia squarrosa						x	
Parmelinopsis horrescens					x		
Parmelinopsis minarum						x	
Parmeliopsis subambigua					x		
Parmotrema hypoleucinum					x		
Parmotrema hypotropum						x	
Parmotrema perforatum						x	
Parmotrema subisidiosum						x	
Parmotrema submarginale						x	
Parmotrema xanthinum						x	
Peltigera praetextata		x					
Pertusaria epixantha						x	
Pertusaria multipunctoides						x	
Pertusaria ophthalmiza						x	

Table 1. *Continued.*

Taxon	L	L/M	S	T	C	H	O
Pertusaria paratuberculifera						x	
Pertusaria propinqua						x	
Pertusaria subpertusa						x	
Pertusaria texana						x	
Pertusaria velata						x	
Phaeocalicium polyporaeum							x
Phaeographis inusta						x	
Phaeophyscia rubropulchra						x	
Phlyctis ludoviciensis						x	
Physcia americana						x	
Physcia millegrana						x	
Physcia pumilior						x	
Placynthiella sp.		x					
Placynthiella uliginosa				x			
Porina heterospora						x	
Pseudosagedia cestrensis						x	
Pseudosagedia raphidosperma						x	
Punctelia missouriensis						x	
Punctelia rudecta						x	
Punctelia subrudecta					x	x	
Pyrenula pseudobufonia						x	
Pyrenula punctella						x	
Pyrrhospora varians					x	x	
Pyxine sorediata						x	
Ramonia microspora						x	
Schismatomma glaucescens						x	
Scoliciosporium chlorococcum						x	
Tephromela atra						x	

Table 1. *Continued.*							
Taxon	L	L/M	S	T	C	H	O
Thelidium minutulum			x				
Thelotrema monospermum					x		
Thelotrema subtile						x	
Trapeliopsis flexuosa		x			x		
Trypethelium virens							x(Ilex)
Tuckermanopsis americana					x		
Usnea pensylvanica						x	
Usnea strigosa						x	
Usnea subscabrosa					x		
Usnea trichodea					x		
sterile isidiate crust						x	
sterile sorediate crust 1						x	
sterile sorediate crust 2						x	
sterile sorediate crust 3						x	
sterile sorediate crust 4						x	
sterile sorediate crust 5						x	
sterile sorediate crust 6						x	
sterile sorediate crust 7						x	

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Megalaria beechingii (lichenized ascomycota), a New Species from Eastern North America

JAMES C. LENDEMER[1]

ABSTRACT. – *Megalaria beechingii*, a new species from the southern Appalachian Mountains, USA is described.

INTRODUCTION

Recently, I received a number of interesting collections made by Sean Beeching from the southern Appalachian Mountains of North America. Among the specimens was a puzzling saxicolous crustose lichen that, upon further study, was recognized as an undescribed species of *Megalaria*. A trip to the locality allowed me to gather additional ecological data as well as ample material to allow detailed study and to serve as a type specimen. Subsequent examination of undetermined material in the herbarium of the New York Botanical Garden (NY) resulted in the discovery of several additional collections of the species. The material is here described as *Megalaria beechingii*.

MATERIALS & METHODS

Specimens were initially studied using a standard light dissecting microscope. Hand cut sections were prepared using a razor blade and by wetting the thallus/apothecia with water. Apothecial anatomy, pigments, and the characteristics of the asci and ascospores were examined following the methods of Ekman (1996). Photographs were prepared using a CoolPix 950 Digital Camera with the images assembled and edited (for grayscale and improved contrast) in Adobe Photoshop. TLC was performed using solvent C following the methods of Culberson and Kristinsson (1970). Selected specimens used for comparison are cited in Appendix I.

TAXONOMIC SECTION

Megalaria beechingii **Lendemer sp. nov.**

Ab *Megalario pulvereo* substrato rupicola, hypothecio brunneo (K+ violaceus), et acido fumarprotocetrarico nullo differt.

TYPE: **USA.** GEORGIA. RABUN CO.: Lake Burton Wildlife Management Area, vicinity of Popcorn Overlook, just south of US Route 76, north of Lake Burton, ~7.5 miles east of Clayton, Lake Burton Quad., elev. ca. 750 ft., humid overgrown dunite barren, on ridge-top, above tributary to Lake Burton, south-facing slope, pine (*Pinus*) – oak (*Quercus*) forest above, mixed hardwoods (*Acer, Nyssa, Quercus*) below, on large boulders, 17.IX.2006, *J.C. Lendemer et al. 7700* (NY, holotype; CANL, PH-HBL, UCR, isotypes)

DESCRPITION. – **Thallus** crustose, saxicolous, blue-gray to greenish-gray, areolate with areoles resting on a well developed white prothallus; prothallus white, fibrous in the available material; areoles arising from thalline warts near the growing edge of the thallus, initially ± globose and convex, becoming flattened with age and aggregating as the thallus grows until forming a ± continuous areolate crust; granules (granulose soredia) forming from the apical breakdown of areoles (plate 1, figure 3). **Apothecia** biatorine, epruinose, purple-black to jet black, initially plane and eventually becoming convex; margin concolorous with disc, persistent, becoming ± excluded in convex apothecia; proper exciple laterally 80–100µm thick, occasionally with few large crystals, the interior dark brown-black (K–, HNO3–) contrasting distinctly with the hyaline rim and the hypothecium, the outermost cells of the rim with variable amount of bluish-green pigment (blue-green, K± intense blue-green, HNO3+ red, often faint in mature apothecia), composed of loose radiating hyphae, continuous under the hypothecium; hypothecium brown-red to dark brownish black (K+ purple-red, HNO3+ intense brown), 50µm high; hymenium 100–110µm high, hyaline though often with streaks of pigment from hypothecium in the lower portions; epihymenium with variable blue-black pigmentation (K± purplish, HNO3+ red), often with bluish excipular pigment extending from rim of proper exciple to adjacent portions; paraphyses unbranched to little branched above, ± anastomosed below; asci *Bacidia*-type, cylindrical to ± clavate, octosporous; ascospores broadly ellipsoid, often bent toward one side (kidney bean-shaped), hyaline, 1-septate, thick walled, not halonate, (12.7) –13.8– (14.8) x (4.6) –5.1– (5.4)µm (n=15; xbar ± 0.25s); pycnidia not seen.

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Chemistry. – Atranorin and zeorin by TLC. Spot tests, K+ yellow, KC+ yellowish, C-, PD-, UV-.

Ecology & Distribution. – Initially *Megalaria beechingii* was known only from the type locality, a small ridge-top dunite barren in the southern Appalachian Mountains of eastern North America. The barren is bisected by a major highway and is somewhat overgrown. It is located on a south-facing slope above a small stream, and the topography and proximity to water have created a micro-habitat with high humidity; as was evidenced by the luxuriant growth of both corticolous and saxicolous macrolichens. It should be noted that, whereas many normally corticolous species were found on rocks at the locality, *M. beechingii* was exclusively saxicolous. The species is also remarkably abundant at the type locality, seemingly the dominant crustose lichen on many exposed rocks.

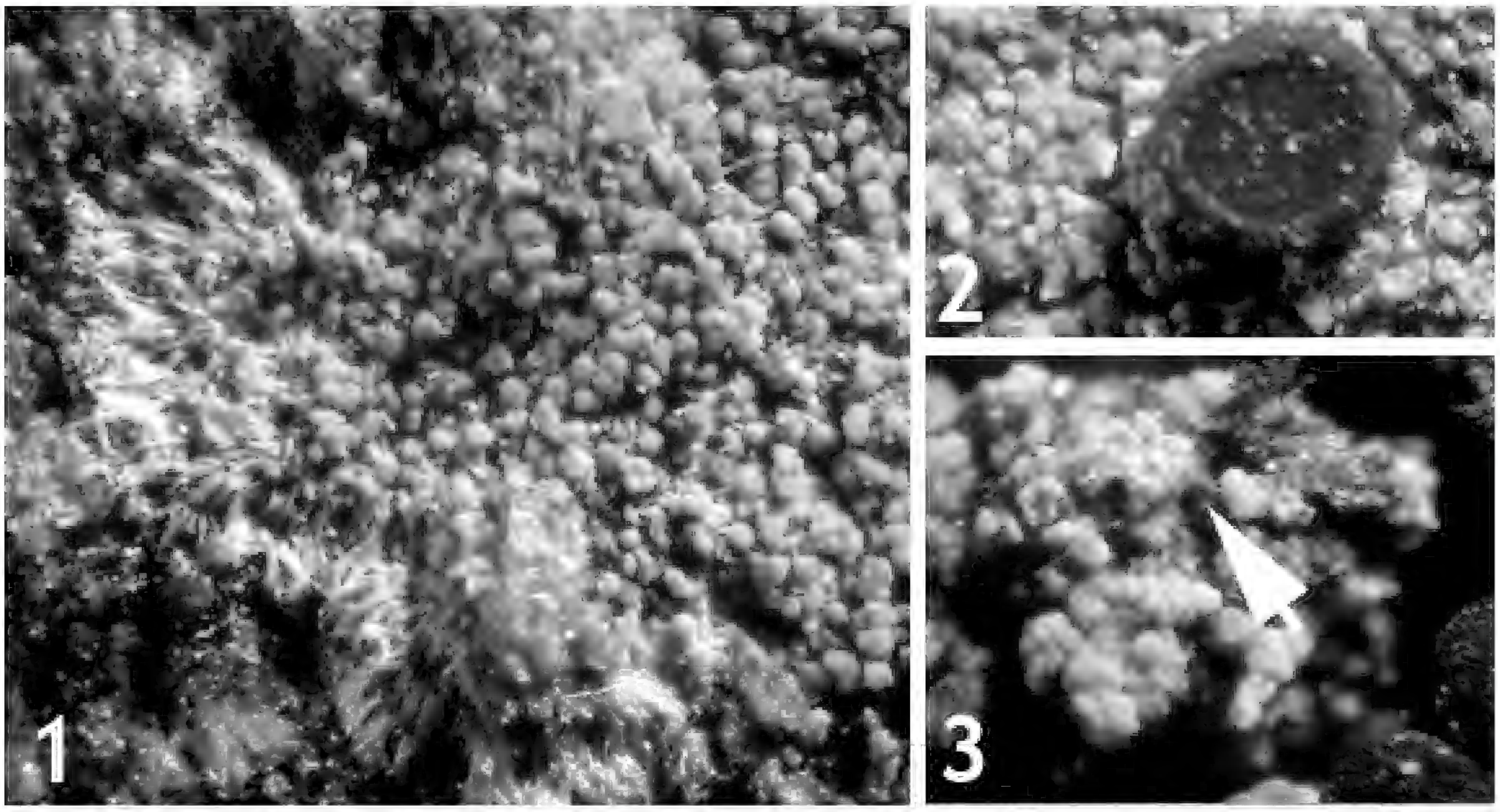
The dominance of *M. beechingii* at the type locality, coupled with the lack of previous collections (excepting a sterile collection made by R.C. Harris in the vicinity of the type locality) at first led me to assume the species was a narrow endemic. However, a search of undetermined material in the herbarium of the New York Botanical Garden revealed two additional collections from Clay Co., North Carolina.

Associated saxicolous species found with *M. beechingii* include *Acarospora dispersa* H. Magn., *Diploschistes actinostomus* (Pers.) Zahlbr., *D. scruposus* (Schreb.) Norman, *Fellhanera* sp., *Gomphillus americanus* Essl., *Hypotrachyna* spp., *Lasallia papulosa* (Ach.) Llano, *Parmotrema reticulatum* (Taylor) M. Choisy, *Pertusaria plittiana* Erichsen, and *Phlyctis petraea* ined.

Discussion. – The genus *Megalaria* Hafellner was established by Hafellner (1984) to accommodate a single species, *M. grossa* (Pers. ex Nyl.) Hafellner, that had previously been placed in *Catillaria* A. Massal. or *Catinaria* Vain. The type species, *M. grossa*, differs significantly from the other sixteen species that have subsequently been placed in the genus by others (Ekman and Tønsberg 1996, Fryday 2004a, 2004b, Galloway 2004, Schreiner and Hafellner 1992), perhaps most notably in having a different ascus type and photobiont.

When Ekman and Tønsberg (1996) described the corticolous species *M. brodoana* from the Pacific Northwest of North America, they took the opportunity to discuss the problems associated with the circumscription of *Megalaria*, particularly the seemingly isolated position of the type species. Ekman and Tønsberg (1996) concluded that whereas differences exist among the taxa referred to *Megalaria* there are also substantial similarities. The authors thus proposed two alternative circumscriptions of *Megalaria*, one restricting the genus to the type species *M. grossa*, and the other adopting a “broad” concept of the genus reflecting the similarities in apothecial anatomy and tendencies in ascus type. Ekman and Tønsberg (1996) adopted the latter circumscription of the genus, which was subsequently confirmed with molecular data (Ekman 2001).

The new species differs most obviously from *M. pulverea* by its saxicolous habit and dark pigmented hypothecium, the two species are otherwise quite similar and, *M. pulverea* (Borrer) Hafellner & E. Schreiner has been reported from North America (Esslinger 2006). Interestingly, while the species are also chemically similar in the production of atranorin and zeorin, *M. beechingii* seems to constantly lack fumarprotocetraric acid, which is sometimes present in *M. pulverea* (fumarprotocetraric acid is present in a collection of *M. pulverea* from Rabun Co., Georgia (NY!)).



Figures 1-3. *Megalaria beechingii* (holotype). Figure 1. Thallus with distinct prothallus and formation of areoles along growing edge. Figure 2. Apothecium. Figure 3. Formation of granulose soredia from the apical breakdown of areoles.

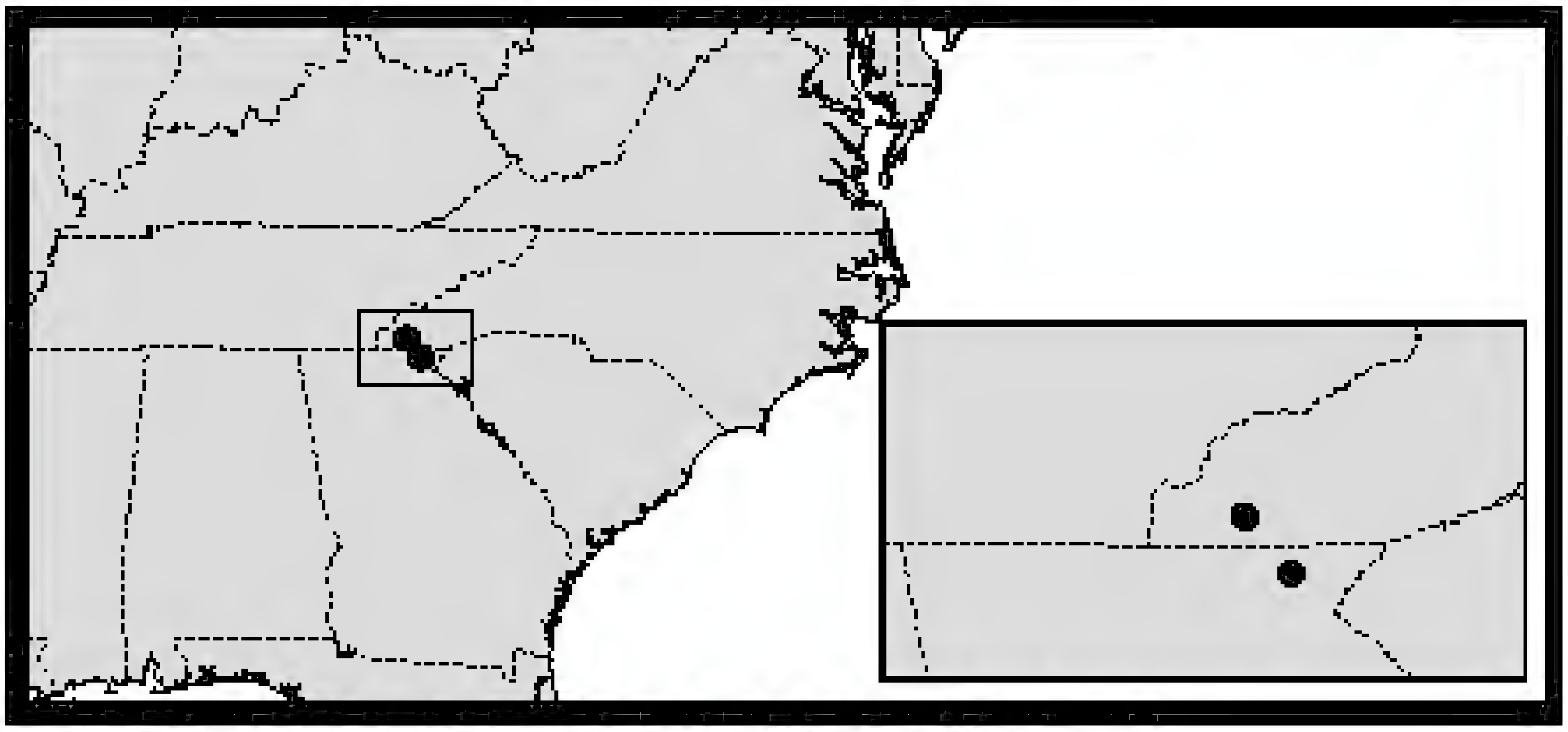


Figure 4. Known distribution of *Megalaria beechingi,* in eastern North America.

Within the larger, broad context of *Megalaria* the new species is distinguished by the unique combination of thalline and apothecial characters, saxicolous habit, and chemistry. *Megalaria beechingii* is one of only three currently recognized, species of *Megalaria* that are not corticolous. The three other saxicolous and terricolous species of *Megalaria* being only recently recognized (Fryday 2004a, 2004b). None of these taxa have been reported from eastern North America, and all three differ in apothecial or thalline characters. Coppins (1992) reported several saxicolous specimens of *M. grossa* from Europe but that species has ascospores and apothecia much larger than those of *M. beechingii* and is not known to produce lichen substances (Ekman and Tønsberg 1996).

ADDITIONAL SPECIMENS EXAMINED. – **USA**. GEORGIA. RABUN CO.: 12.2. mi. W of Clayton, 11.vi.1991, *R.C. Harris 13796* (NY, sterile); vicinity of Popcorn Overlook, 27.vii.2006, *S.Q. Beeching s.n.* (PH-HBL) NORTH CAROLINA. CLAY CO.: Nantahala National Forest, along Buck Creek Road, 1.2 mi. NNW of US 64, 9.x.1998, *R.C. Harris 42695* (NY), *R.C. Harris 42729* (NY).

ACKNOWLEDGEMENTS

First and foremost I thank Sean Beeching for sending this and other interesting species from the southern Appalachians as well as for accompanying me for several days of field work in northern Georgia and adjacent North Carolina. Irwin Brodo, Alan Fryday and Richard Harris are thanked for helpful discussion and criticism of the manuscript. Also, Andy Moroz for his companionship during field work and the curators of CANL, MSC, and NY for locating and loaning comparative material of other *Megalaria* species used in this study.

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APPENDIX I

SELECTED SPECIMENS EXAMINED OF ADDITIONAL MEGALARIA SPECIES. – **M. BRODOANA. – CANADA.** BRITISH COLUMBIA.: Queen Charlotte Islands, Moresby Island, Tasu, 52°46'N, 132°02'W, in *Picea-Thuja* forest on Gowing Island, on *Almnus* [sic] *rubra* above beach, 29.vii.1967, *I.M. Brodo et al. 12844* (CANL, PARATYPE); Queen Charlotte Islands, Moresby Island, Jedway, 52°18'N, 131°13'W, along road to foot of Harriet Harbour and near stream inlet, *Picea-Tsuga-Alnus* stand at shore, on *Tsuga* at edge of forest, 26.vii.1967, *I.M. Brodo et al. 12552* (CANL, PARATYPE), *I.M. Brodo et al. 12569* (CANL, PARATYPE). **M. COLUMBIANA. – CANADA.** BRITISH COLUMBIA.: Didney, on alder trunks, 12.xii.1912, *J. Macoun 59* (CANL, ISOLECTOTYPE). **M. GROSSA. – SPAIN.** CANARY ISLANDS.: Tenerife, Fayal-brezal with scattered pines, between Agua Garcia and Monte de La

Esperanza, 1100 m., 26.ii.1964, central mountain range, *H.A. Imshaug et al. 35856* (MSC); Fayal-brezal zone, ridge from Piedra Chinobre to Pico de Limante, 800 m., 21.ii.1964, Sierra de Anaga, *H.A. Imshaug et al. 35673A* (MSC). **M. IMSHAUGII.** – **NEW ZEALAND.:** Campbell Island, Rock outcrops and tussock grass-land on summit ridge of Beeman Hill, 600-650 ft., 24.xii.1969, *R.C. Harris 4535* (MSC, PARATYPE), *R.C. Harris 4537* (MSC, PARATYPE). **M. JEMTLANDICA.** – **USA.** ALASKA. BARROW.: Dry bank north of North Meadow Lake, 70°18'40"N, 156°39'15"W, 0 m., 18.vii.2001, *A. Fryday 8370* (MSC). **M. LAURERI.** – **CANADA.** ONTARIO.: Nipissing District, Lookout Trail, Algonquin Provincial Park, ix.1960, on *Acer*, *H.A. Imshaug 26876* (MSC). **USA.** MICHIGAN. CHEBOYGAN CO.: Moist hardwoods in gorge of Carp Creek, University of Michigan Biological Station, 10.vii.1967, on *Fagus*, *R.C. Harris 3655* (MSC). **M. MELANOTROPA.** – **NEW ZEALAND.:** Campbell Island, *Dracophyllum* scrub on north side of Preserverance Harbour, about half-mile north of Beeman Station, 22.i.1970, *R.C. Harris 5694* (MSC). **M. PULVEREA.** – **BRITISH ISLES.:** England, V.C. 3 South Devon, Dartmoor, Okehampton, Throwleigh, Blackaton Brook, Grid Ref. 20/65-91, on bole of *Quercus* in sheltered, rather moist woodland, 14.xii.1975, *P.W. James s.n.* (CANL, FERTILE).

Opuscula Philolichenum, **4**: 45-50. 2007.

Lepraria normandinoides, a New Widespread Species from Eastern North America

JAMES C. LENDEMER[1] & RICHARD C. HARRIS[2]

ABSTRACT. – *Lepraria normandinoides*, a new species found to be widely distributed in eastern North America, USA is described.

INTRODUCTION

For some time we have been aware of the occurrence of a species of *Lepraria* in eastern North America, comparable to *L. nivalis* J.R. Laundon in chemistry, but quite different in morphology and ecology. The second author encountered this taxon when he began studying *Lepraria* in the late 1970's and at first annotated specimens as "*L. lobificans* Nyl. s. lat." because of a perceived similarity to French material identified by Nylander as *L. lobificans* but differing in chemistry. We have referred to the species in previous publications as "*Lepraria* sp." or, more recently as "*Lepraria normandinoides* ined.", the latter name having been derived from the resemblance of the lobes of the thallus to the squamules of *Normandina pulchella* (Borr.) Nyl. We have now had the opportunity to compare material of this species to a paratype of *L. nivalis*, and have collected abundant material to serve as types. The description of this new species adds to our growing knowledge of North American *Lepraria* (Knudsen et al. 2006, 2007; Knudsen and Elix in press., Lendemer 2005).

METHODS

During field work throughout North America we have actively collected all material potentially referable to the genus *Lepraria,* hundreds of collections, and have routinely encountered *Lepraria normandinoides* in eastern North America. The chemistry of our specimens has routinely been studied with thin layer chromatography (TLC) using solvents A, C, and G following the standardized methods of Culberson and Kristinsson (1970) and Culberson et al. (1981). A representative (see discussion of chemistry) specimen of *L. normandinoides* was also studied using HP-TLC by Jack Elix. The morphology of specimens has been examined using standard light microscopy. Measurements were obtained from hand cut sections of the thallus mounted in water. Illustrations were prepared using a Nikon CoolPix 950 digital camera with the aid of Adobe Photoshop CS2.

TAXONOMIC SECTION

Lepraria normandinoides Lendemer and R.C. Harris sp. nov.

Thallus leprosus stratosus robustus lobatus lacteus tenuis, rhizohyphis brunneolis ad substratum laxe affixus, acidum atranoricum, roccellicum, et protocetraricum vel fumaprotocetraricum continens.

TYPE: **USA.** NORTH CAROLINA. TRANSYLVANIA CO.: Nantahala National Forest, Shower Falls, along Cold Mountain Road, south slope of Panthertail Mountain, Lake Toxaway Quad., elev. 3500 ft., 35° 09' 34"N, 82° 58' 26"W, small roadside waterfall over gneiss, on gneiss overhang, 29.v.2006, *J.C. Lendemer et al. 7001* (NY!, holotype; isotypes to be distributed in *Lichens of Eastern North America V: 221*).

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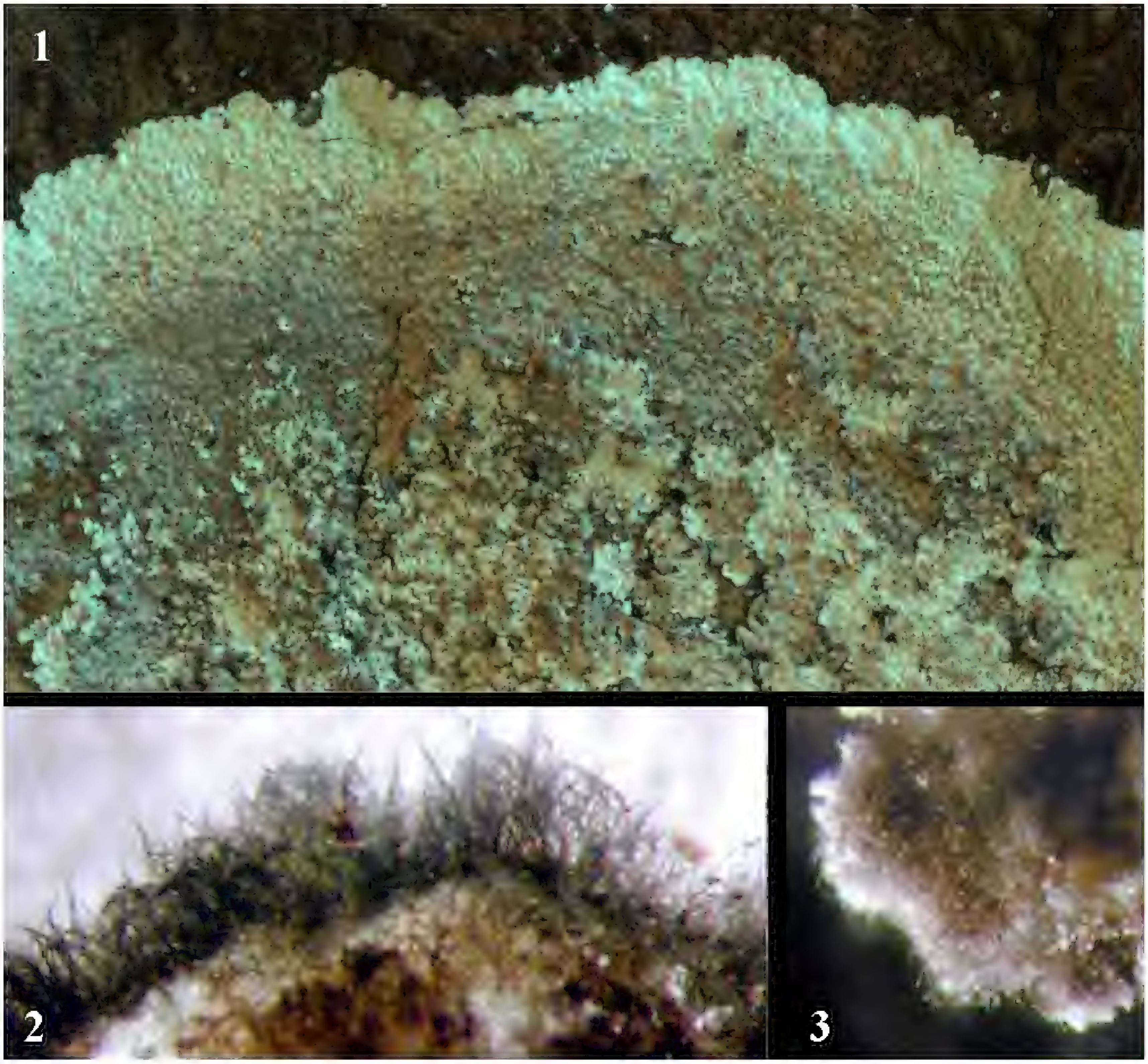

Plate 1. *Lepraria normandinoides*. Figure 1. Thallus growing on smooth rock face, photo-voucher (*Harris 38777*, NY; photo by Frankie Snow). Figure 2. Rhizohyphae extending from lower surface, viewed from above (*Lendemer 2985*, PH-hbL; x 32). Figure 3. Underside of thallus (*Harris 38777*, PH-hbL; x 25.6).

Description. – **Thallus** saxicolous or corticolous, crustose, weakly anchored to the substrate by rhizohyphae, easily detached in large pieces, distinctly bluish-white, to greenish-blue when growing in shaded situations, forming scattered isolated thalli consisting of isolated lobes or a continuous well developed crust with marginal lobes resembling *Normandina pulchella* in overall aspect (having thickened margins); **upper surface** continuous, composed of ± globose soredia held together by a network of gelatinized hyphae; **medulla** prosoplectenchymatous, composed of anticlinal hyaline hyphae coated with irregular POL+ crystals; **lower surface** pale, underlain by rhizohyphae; **rhizohyphae** branching, extending from the medulla to anchor the thallus to the substrate; **soredia** 30-60µm in diameter, without projecting hyphae; **hyphae** 3–5µm wide, septate, branching, hyaline above (upper surface, medulla, lower surface) and brown in the rhizohyphae; **crystals** calcium oxalate[?], small, irregular, coating hyphae of the upper surface and medulla, POL+, not dissolving in KOH; **photobiont** green, coccoid, 7-10µm in diameter.

Chemistry. – Three chemotypes of *Lepraria normandinoides* have been observed in North America. HP-TLC of a specimen of chemotype I (*Lendemer 2182,* UCR!) revealed a trace of virensic acid, this substance was not routinely detected by our TLC.

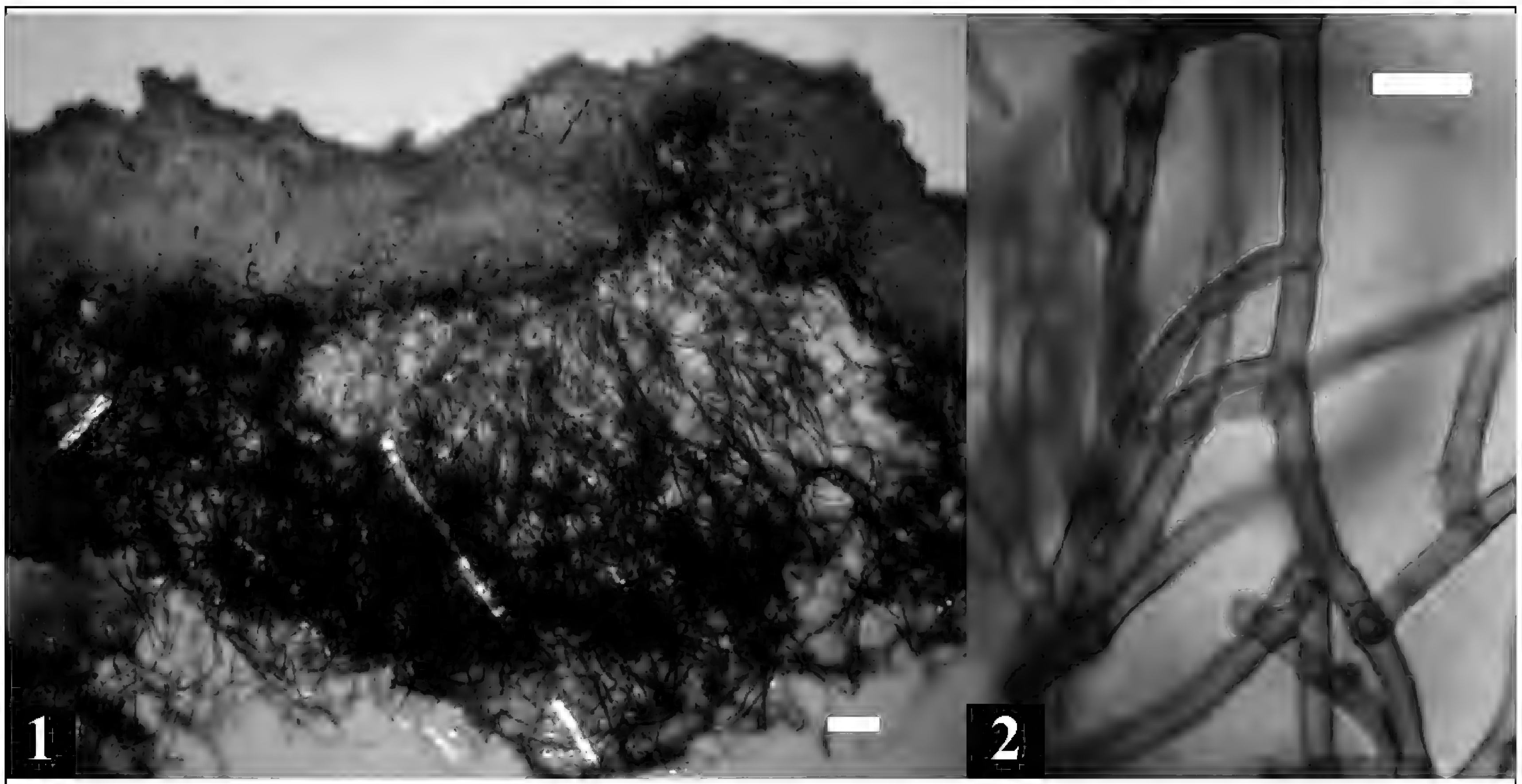

Plate 2. *Lepraria normandinoides*. Figure 1. Section through thallus illustrating well developed rhizohyphae extending from medulla (*Lendemer 2985*, PH-hbL; scale = 50um). Figure 2. Detail of rhizohyphae (*Lendemer 2985*, PH-hbL; scale = 10um).

Chemotype I – TLC: atranorin, protocetraric acid (major), roccellic/angardianic acid; spot tests: K+ yellow, C–, KC+ yellowish, PD+ orange/red.

Chemotype II – TLC: atranorin, fumarprotocetraric acid (major), protocetraric acid (minor), roccellic/angardianic acid; spot tests: K+ yellow, C–, KC+ yellowish, PD+ orange/red.

Chemotype III – TLC: atranorin, roccellic/angardianic acid; spot tests K+ yellow, C–, KC+ yellowish, PD–.

Distribution. – *Lepraria normandinoides* is widely distributed in eastern North America, having a primarily Appalachian distribution (cf. Brodo et al. 2001) with a disjunct population in the Ozarks. Scattered collections are also known from the Coastal Plain, Great Lakes, and Piedmont Regions. The fumarprotocetraric acid and protocetraric acid chemotypes are widely distributed. As is illustrated by the distribution maps and cited specimens the protocetraric acid chemotype, represented by 127 of 155 specimens examined, is considerably more common than the fumarprotocetraric acid chemotype. The fumarprotocetraric and protocetraric acid deficient chemotype is rare and only known from the northern edge of the range of the species where it occurred as an admixture with the protocetraric acid chemotype

Ecology. – *Lepraria normandinoides* occurs on the bark of hardwood trees and on acidic rocks in semi-shaded sites with moderate to high humidity. When growing on rocks the species is most often found on vertical faces and, as in the type collection, on the exposed (not fully shaded) portions of massive rock overhangs. While showing a preference for wet rocks and seepage faces the species is not found in drainages where water is constantly flowing but rather, in adjacent areas that are not continuously wet.

Discussion. – The presence of atranorin and protocetraric (or chemically related fumarprotocetraric acid) in *Lepraria normandinoides* would clearly lead one to compare the new species to the chemically similar *L. nivalis* J.R. Laundon. The new species is easily separated from *L. nivalis* by the presence of rhizohyphae, smaller soredia, the production of roccellic/angardianic acid in addition to atranorin and protocetraric or fumarprotocetraric acid, and preference for acidic rocks and the bark of hardwoods. As may be inferred from the above, *L. nivalis* lacks well developed rhizohyphae, has large soredia, does not produce fatty acids, and is a species primarily of calcareous rocks (Laundon 1992).

In eastern North America *L. normandinoides* cannot easily by confused with any other species as the combination of a lobed thallus, production of atranorin and protocetraric/fumarprotocetraric acid, and rhizohyphae are distinctive. In the field *L. lobificans* Nyl. can be confused with the new species, *L. lobificans* is easily recognized by the green color of the thallus, different chemistry (atranorin, zeorin, stictic acid syndrome), and the absence of rhizohyphae.

As noted by Laundon (1992) the type of *L. nivalis* lacks the fatty acid present in *L. normandinoides*. Considering the chemical and morphological similarities between *L. nivalis* s. str. (as typified and described by Laundon) and *L. normandinoides* it is likely that most reports of *L. nivalis* from North America belong to *L. normandinoides*. Further study is required to determine if *L. nivalis* s. str. occurs in North America. The morphological, ecological, and chemical differences between *L. nivalis* s. str. and *L. normandinoides* however, readily serve to separate the species.

Selected specimens examined. **Chemotype I. – Canada**. **Quebec**. Haut Saint Maurice Co.: *Anselm 11296* (NY!). **USA**. **Alabama**. Clay Co.: Talladega National Forest, *Harris 28390* (NY!). Jackson Co.: Pisgah, *Harris 43351* (NY!). **Arkansas**. Franklin Co.: Ozark National Forest, Boston Mountain Ranger District, *Harris 49274* (NY!). Newton Co.: Ozark National Forest, *Lendemer 6557* (NY!). **Connecticut** Windham Co.: Town of Ashford, *Harris 46109* (NY!). **Georgia**. Appling Co.: Along Co. Rd. 341, *Harris 36403* (NY!). Coffee Co.: Broxton Rocks Ecological Preserve, *Harris 32707* (NY!). DeKalb Co.: DeSoto State Park, *Buck 34741* (NY!). Emanuel Co.: 1.5 miles N of US 80 on Foskey Rd., *Harris 36299* (NY!). Jeff Davis Co.: 0.4 mi E of Coffee County Line, *Harris 38777* (NY!). Johnson Co.: 2 miles N of Adrian, *Harris 36287* (NY!). Laurens Co.: *Harris 36346* (NY!). Putnam Co.: Oconee National Forest, *Harris 38707* (NY!). Rabun Co.: Lake Burton Wildlife Management Area, *Lendemer 7547* (NY!). Walker Co.: Chattahoochee National Forest, Keown Falls, *Harris 28273* (NY!). Washington Co.: ~3 miles N of Harrison, *Harris 36270* (NY!). **Illinois**. Gallatin Co.: Shawnee National Forest, Indian Wall Recreation Area, *Buck 35936* (NY!). Jackson Co.: Shawnee National Forest, *Skorepa 2247* (NY!). Pope Co.: Shawnee National Forest, Burden Falls, *Phillippe 28777* (NY!). Randolph Co.: Piney Creek Ravine Nature Preserve, *Harris 50566* (NY!). **Kentucky**. Bath Co.: Daniel Boone National Forest, *Harris 36882* (NY!). Letcher Co.: Bad Ranch Nature Preserve, *Harris 27023* (NY!). **Maine**. Hancock Co.: N. of ME 182, 8 mi W of junct. Of Unionville Rd., *Harris 53043* (NY!). Oxford Co.: Berry Ledge, *Parlin 9897* (NY!). **Maryland**. Baltimore Co.: Harford Road Bridge, Gunpowder Falls, *Plitt 328* (NY!). Cecil Co.: Rock Creek Rd. off Rt. 273, *Reed 126440* (NY!). **Massachusetts**. Berkshire Co.: Bartholomew's Cobble, NW of Ashley Falls, *Harris 13540* (NY!). **Minnesota**. Saint Louis Co.: Voyageurs National Park, *Wetmore 39989p.p.* (NY!). **Mississippi**. Tishomingo Co.: Tishomingo State Park, *Harris 28584* (NY!). **Missouri**. Carter Co.: Bluff on E. side of Current River, *Harris 25660* (NY!). Dade Co.: Bona Glade Natural Area, *Harris 50888* (NY!). Iron Co.: E slope of Royal Gorge, *Harris 21781* (NY!). Lawrence Co.: Fall Hollow Gorge, *Lendemer 6183* (NY!). Madison Co.: Amadon State Forest, *Ladd 12951* (NY!). Newton Co.: Wildcat Glade Natural Area, *Buck 42997* (NY!). Reynolds Co.: St. Francis Mountains, Johnson Shut-Ins State Park, *Harris 31254* (NY!). Saint Genevieve Co.: S of Sprott, *Wilhelm 13676* (NY!). **New York**. Dutchess Co.: Town of Red Hook, *BF100* (NY!). Essex Co.: Town of Keene, *Harris 50039* (NY!). Greene Co.: Catskill Park, Devil's Path, *Harris 38516* (NY!). Jefferson Co.: Wellesley Island State Park, *Harris 16746* (NY!). Orange Co.: Harriman State Park, *Harris 42144* (NY!). Rockland Co.: Bear Mountain State Park, *Harris 13385* (NY!). Ulster Co.: Catskill Mountains, *Harris 30497* (NY!). Warren Co.: Crane Mountain, *Harris 30578* (NY!). Westchester Co.: Croton Dam Rd., *Prince 75-65* (NY!). **North Carolina**. Clay Co.: Standing Indian Wildlife Management Area, *Lendemer 7909* (NY!). Jackson Co.: Nantahala National Forest, Panthertown Valley, *Lendemer 6977* (NY!). Macon Co.: Ravenel Park, *Lendemer 7003* (NY!). Mitchell Co.: Pisgah National Forest, Roan High Bluff, *Harris 30914* (NY!). Swain Co.: Great Smoky Mountains National Park, Hughes Ridge Trail, *Harris 10795* (NY!). Transylvania Co.: Gorges State Park, *Lendemer 4566* (NY!). **Ohio**. Gallia Co.: Wayne National Forest, *Lendemer 7437* (NY!). Scioto Co.: Shawnee State Forest, *Lendemer 7173* (NY!). **Oklahoma**. Cherokee Co.: J.T. Nickel Family Nature and Wildlife Preserve, *Harris 44331* (NY!). **Pennsylvania**. Bucks Co.: Nockamixon State Park, *Lendemer 1964* (NY!). Montgomery Co.: Fulshaw Craig Preserve, *Lendemer 1868* (NY!). Pike Co.: Delaware Water Gap National Recreation Area, *Lendemer 2464* (NY!). Sullivan Co.: Worlds End State Park, *Lendemer 5277* (NY!). **Rhode Island**. Providence Co.: Town of Lincoln, *Harris 53210* (NY!). **South Carolina**. Greenville Co.: Along US 276, 0.2 mi downhill of Bald Rock, *Harris 43449* (NY!). Lancaster Co.: Forty Acer Rock Heritage Preserve, *Harris 43457* (NY!). Lexington Co.: Peachtree Rock Nature Preserve, *Harris 39954* (NY!). **Tennessee**. Monroe Co.: Cherokee National Forest, *Harris 32915* (NY!). Scott Co.: Big South Fork National River, *Harris 32967* (NY!). **Virginia**. Patrick Co.: Blue Ridge Parkway, Rock Castle Gorge Loop, *Harris 36656* (NY!). **West Virginia**. Grant Co.: Greenland Gap, *Harris 44846* (NY!). Greenbrier Co.: Wades Draft, *Harris 44035* (NY!). Morgan Co.: Rte. 8, S of Cacapon, *Reed 11125* (NY!). Pocahontas Co.: Watoga State Park, *Harris 43957* (NY!). Tucker Co.: Monogahela National Forest, Fernow Experimental Forest, *LaGreca 805* (NY!).

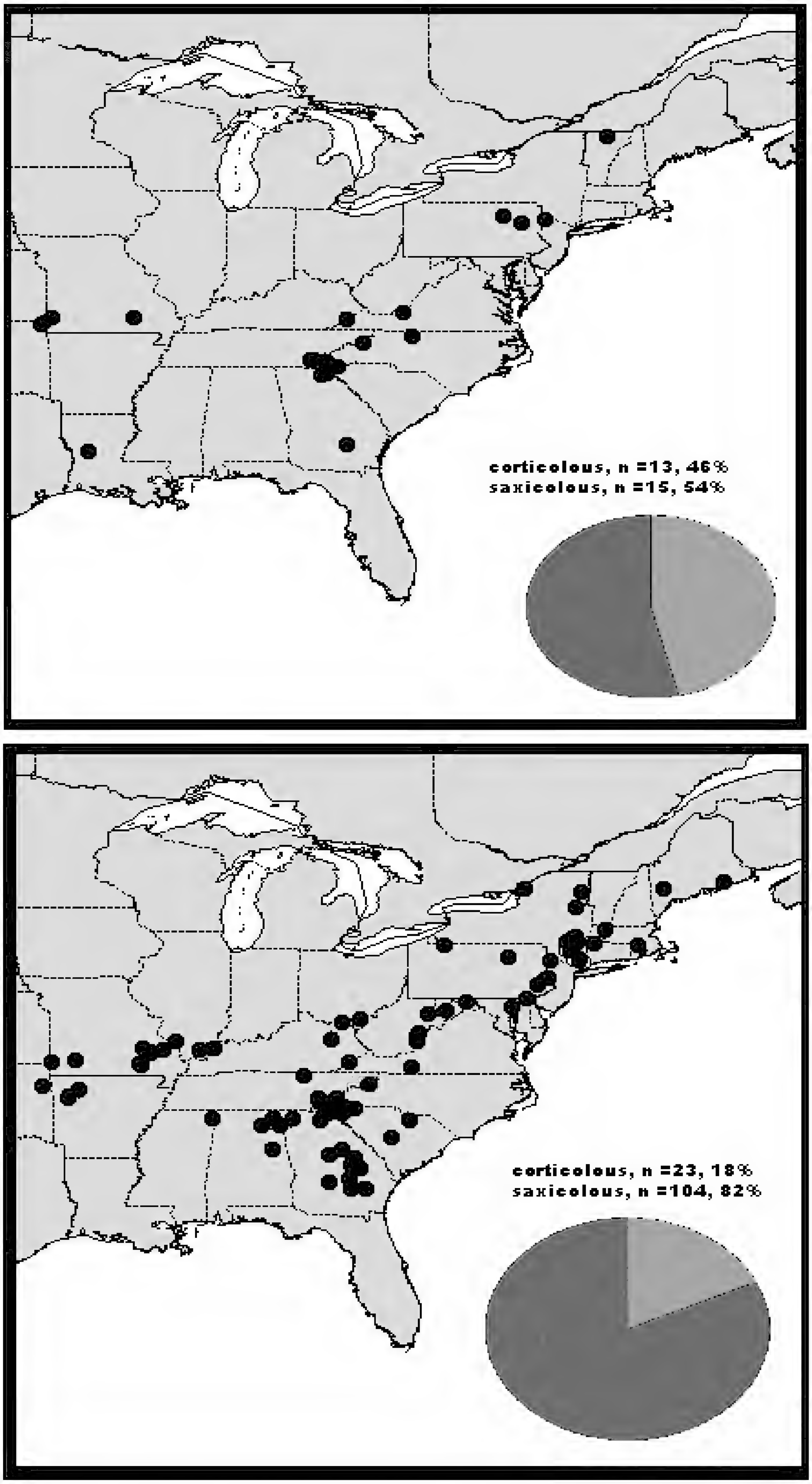

Plate 3. *Lepraria normandinoides.* Distribution of the protocetraric acid chemotype (bottom) and the fumarprotocetraric acid chemotype (top) in eastern North America.

SELECTED SPECIMENS EXAMINED. **CHEMOTYPE II. – USA. ARKANSAS**. STONE CO.: Ozark National Forest, City Rock Bluff Special Interest Area, *Harris 51247* (NY!). **GEORGIA**. COFFEE CO.: Pond Drain, *Harris 36683* (NY!). **KENTUCKY**. LETCHER CO.: Bad Branch Nature Preserve, *Harris 27016* (NY!). **LOUISIANA**. NATICHITOCHES PARISH.: Kisatchie National Forest, *Pruski 2472* (NY!). **MISSOURI**. NEWTON CO.: Wildcat City Park, S edge of Joplin, *Harris 46781* (NY!). SHANNON CO.: Ozark National Scenic Riverways, Rocky Falls, *Harris 25576* (NY!). **NEW YORK**. GREENE CO.: Catskill Mountains, Mink Hollow Trail, *Harris 32861* (NY!). **NORTH CAROLINA**. GRAHAM CO.: Nantahala National Forest, Cherohala Skyway, *Harris 41007* (NY!). HAYWOOD CO.: Great Smoky Mountains National Park, 3 miles SE of Waterville, *Lendemer 8188* (NY!). MACON CO.: Nantahala National Forest, Wayah Bald, *Harris 40970* (NY). STOKES CO.: Hanging Rock State Park, *Harris 30709* (NY!). **OKLAHOMA**. OTTAWA CO.: N of E0060 Rd., *Harris 44436* (NY!). **PENNSYLVANIA**. PIKE CO.: Delaware Water Gap National Recreation Area, *Lendemer 3421* (NY!). SULLIVAN CO.: Worlds End State Park, *Lendemer 5289* (NY!). LUZERNE CO.: Nescopeck State Park, *Lendemer 3999* (NY!). **TENNESSEE**. CARTER CO.: Roan Mountain, *Harris 18359* (NY!). **TEXAS**. LLANO CO.: sine loc., *Whitehouse 48* (NY!). **VERMONT**. ORLEANS CO.: Town of Westfield, *Harris 51347* (NY!). **VIRGINIA**. GILES CO.: Mountain Lake Biological Station, *Harris 36718* (NY!).

SPECIMENS EXAMINED. **CHEMOTYPE III. – MINNESOTA**. SAINT LOUIS CO.: Voyageurs National Park, *Wetmore 39989p.p.* (NY!). **NEW YORK**. ESSEX CO.: Chapel Pond, *Lendemer et al. 2985pp.* (PH-HBL!).

SPECIMENS OF LEPRARIA NIVALIS EXAMINED. **ENGLAND. NORTH-WEST YORKSHIRE:** Muker, Keld, West Wood, dominant on shaded vertical limestone in gorge, growing over *Dermatocarpon miniatum* in places, 3.viii.1979, *Laundon 3076* (NY!, PARATYPE). **IRELAND.** Fermanagh, Marlbank, on vertical limestone cliff, on mosses, 1992, *Fox s.n.* (NY!).

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Opuscula Philolichenum, **4**: 51-54. 2007.

Notes on the Lichen Genus *Lepraria* in Great Smoky Mountains National Park, southeastern North America: *Lepraria lanata* and *L. salazinica* spp. nov.

Tor Tønsberg[1]

ABSTRACT. – *Lepraria lanata* Tønsberg and *L. salazinica* Tønsberg are described as new from the Great Smoky Mountains National Park, North Carolina and Tennessee, U.S.A. *Lepraria lanata* has exceptionally large consoredia, produces protocetraric and angardianic/roccellic acids and occurs on rock walls. It is easily recognized even in the field. *Lepraria salazinica* forms a thin, grayish white cover of soredia and consoredia on overhanging rock surfaces and produces atranorin, salazinic acid, and angardianic/roccellic acid.

Introduction

The Great Smoky Mountains National Park on the border between North Carolina and Tennessee in southeastern U.S.A., is very rich in lichens including sorediate crusts. Based mainly on material collected by the author, several sorediate, crustose species have recently been described as new to science, including *Bacidia lobarica* Printzen & Tønsberg (Printzen & Tønsberg 2007), *Biatora appalachensis* Printzen & Tønsberg (Printzen & Tønsberg 2004), *B. printzenii* Tønsberg (Tønsberg 2002), all with type material collected in the Park. Three further crustose species, the sorediate *B. pontica* Printzen & Tønsberg (Printzen & Tønsberg 2003) and *Vainionora americana* Kalb, Tønsberg & Elix (Kalb 2004), as well as the esorediate *Biatora pycnidiata* Printzen & Tønsberg (Printzen & Tønsberg 2004) were described with material from the Park. These species are mainly corticolous although some also occur on wood and rock. In the present note two saxicolous species of *Lepraria* are described as new.

Materials And Methods

This study is based on material from the Great Smoky Mountains National Park (GSMNP) collected by the author and deposited in BG in addition to three specimens (including one from outside the park) from NY and one from UPS. Thin-layer chromatography was carried out according to the methods of Culberson & Kristinsson (1970) and Culberson (1972) with later modifications. Fatty acids with Rf-values similar to those of angardianic acid and roccellic acid, which can not be separated by thin-layer chromatography (Leuckert et al. 1995), are referred to as angardianic/roccellic acid.

Results

Lepraria lanata Tønsberg sp. nov.

Thallus leprosus, plerumque non stratosus, constans ex consorediis conspicuis ad 1 mm diam. Paginis arachnoideis, albidis vel caesio-/fusco-griseis; acide protocetraricum et angardianicum/roccellicum continens.

TYPE: **USA.** Tennessee. Sevier Co.: Great Smoky Mountains National Park, along the Boulevard Trail, 35° 39.11’ N, 83° 25.76’ W, 1870 m, saxicolous on shaded, overhanging, schistose rock wall, 8.ix.2005, *T. Tønsberg 36347* (BG, holotype; ASU, DUKE, NMW, NY, isotypes).

Description. – Thallus leprose, unstratified, effuse, irregularly spreading to 1 dm or more in diam., whitish throughout, or with a ±brownish to bluish gray surface, composed of consoredia (see Tønsberg 1992).

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Consoredia rounded, large and conspicuous, to 1 mm diam., of loose, arachnoid tissue (Fig. 1); hyphae (3−)4−8(−9) µm wide, branched and anastomosed, colourless or, in external parts, often forming a network of brown hyphae giving the thallus a ±brownish or bluish gray colour; tips not projecting. Hypothallus not evident. Photobiont trebouxioid, to 10(−13) µm wide.

Etymology – The specific epithet (*lanatus* = woolly) refers to the consoredia which resemble balls of wool.

Chemistry. – Protocetraric acid, angardianic/roccellic acid. Thallus PD+ orange, K−, C−, KC−.

Ecology And Distribution. – *Lepraria lanata* was saxicolous (most specimens), terricolous or muscicolous on shallow, dry to rather wet overhangs and rock walls. Closely associated lichens included *Cladonia* sp(p). (primary squamules), *Lepraria* spp., and *Leprocaulon arbuscula* (Nyl.) Nyl. At one site, *Cetradonia linearis* (Evans) J.-C. Wei & Ahti (syn. *Gymnoderma lineare* (Evans) Yoshim. & Sharp) grew in the vicinity, albeit in a more rain-exposed niche. The vertical distribution of *L. lanata* ranged from 1120 to 1990 m, but most specimens were from above 1500 m elevation.

Discussion. – *Lepraria lanata* is a very characteristic species which can be readily recognized in the field by the particularly large, arachnoid consoredia and the network of pigmented, external hyphae giving the thallus a partly brownish or more often, a bluish grey tinge. *Lepraria lanata* is chemically similar to chemotypes of *L. nivalis* Laundon (see Laundon 1992) and *L. normandinoides* Lendemer & R.C. Harris (see Lendemer & Harris 2007). The two latter species have well-delimited thalli with marginal lobes and the granules are smaller (to 0.4 mm and 30-60 µm in diameter, respectively); these species should therefore not be confused with *L. lanata.* Based on the material examined, *L. lanata* seems to be endemic to the southern Appalachians – a distribution which it shares with lichens such as, e.g., *Bacidia lobarica* (see map in Printzen & Tønsberg 2007), *Biatora appalachensis* (see map in Printzen & Tønsberg 2004), *Cetradonia linearis* (see map in Wei & Ahti 2002) and *Leioderma cherokeense* P. M. Jørg. & Tønsberg (see map in Jørgensen & Tønsberg 2005).

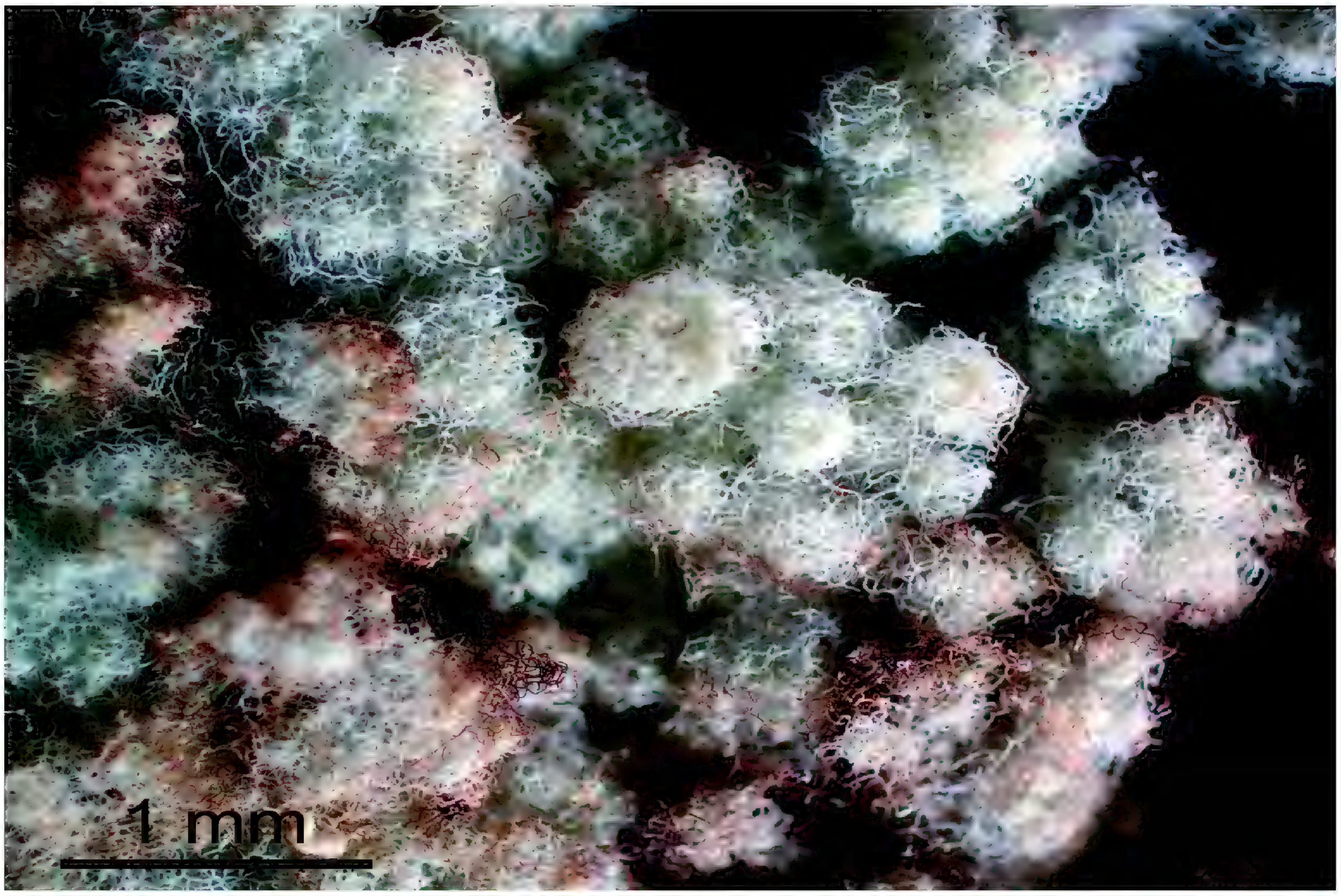
Selected specimens examined. **USA**. **North Carolina. Avery Co.:** Grandfather Mountain, vi.1936, *G. P. Anderson s.n.* (ny). **Swain Co.:** GSMNP, along Clingmans Dome Rd, close to the parking lot loop at end of road, 1915 m, saxicolous on dry and shaded rock wall under overhang, 17.vi.2002, *T. Tønsberg 30847*, *30848* (bg). **Tennessee. Sevier Co.:** GSMNP, along Alum Cave Trail, between Arch Rock and Alum Cave, 1350 m, saxicolous in wet overhang, 24.ix.2003, *T. Tønsberg 33718*, *33719* (bg); along Alum Cave Trail, just SE of Alum Cave, 1500 m, saxicolous/muscicolous/terricolous, 24.ix.2003, *T. Tønsberg 33744, 33745, 33747, 33748, 33752, 33753,* 33754 (all bg); Great Smoky Mountains [National Park], below Alum Cave, on overhanging rocks, about 1515 m, 13.ix.1939, *G. Degelius s.n.* (ups); Mount Le Conte, below Myrtle Point, on cliff, 6000 ft, xi.1935, *A. J. Sharp 59* (ny); Mount Le Conte, beneath Cliff Top, 1930 m, ±muscicolous/saxicolous under overhanging rock, 29.vi.2004, *T. Tønsberg 34117* (bg); off Roaring Fork Motor Nature Trail, at Grotto Falls, 1120 m, saxicolous under shaded overhang near waterfall, 3.vi.2005, *T. Tønsberg 35219* (bg); W of Clingmans Dome, along Appalachian Trail, 1990 m, saxicolous under N-facing overhang below exposed crest, 4.vi.2005, *T. Tønsberg 35253* (bg); along the Boulevard Trail, 1840 m, muscicolous/over plant debris on shaded rock overhang, 8.ix.2005, *T. Tønsberg 36346* (bg); Ramsey Cascades, plant growing on shaded bluff face to the right of the falls, ca. 6-7 feet below the rim, 4400 ft, 6.v.1973, *P. R. Fantz 1* (ny).

Lepraria salazinica Tønsberg sp. nov.

Thallus ubique leprosus, griseo-albidus, tenuis, non stratosus, effusus. Soredia farinosa aut cum consorediis ad 50 µm diam. Acidum atranoricum, salazinicum et angardianicum/roccellicum continens.

TYPE: **USA.** North Carolina. Swain Co.: Great Smoky Mountains National Park, Balsam Mountain, along Balsam Mountain Rd, 4 miles (along the road) from the gate (near the end of Heintooga Rd), 35° 36.2’ N, 083° 11.5’ W, 1420−1450 m, saxicolous under overhang, 20.vi.2002, *T. Tønsberg 30941* (bg, holotype; duke, isotype).

Description. – Thallus leprose, unstratified, not lobed, effuse, thin, grayish-white, forming small patches to a few mm in diameter soon becoming confluent and ±contiguous; soredia to 30 µm in diam., or in consoredia to 50 µm in diam., with a ±complete wall of colourless hyphae; hyphae not projecting; photobiont trebouxioid; cells to 13 µm in diam.



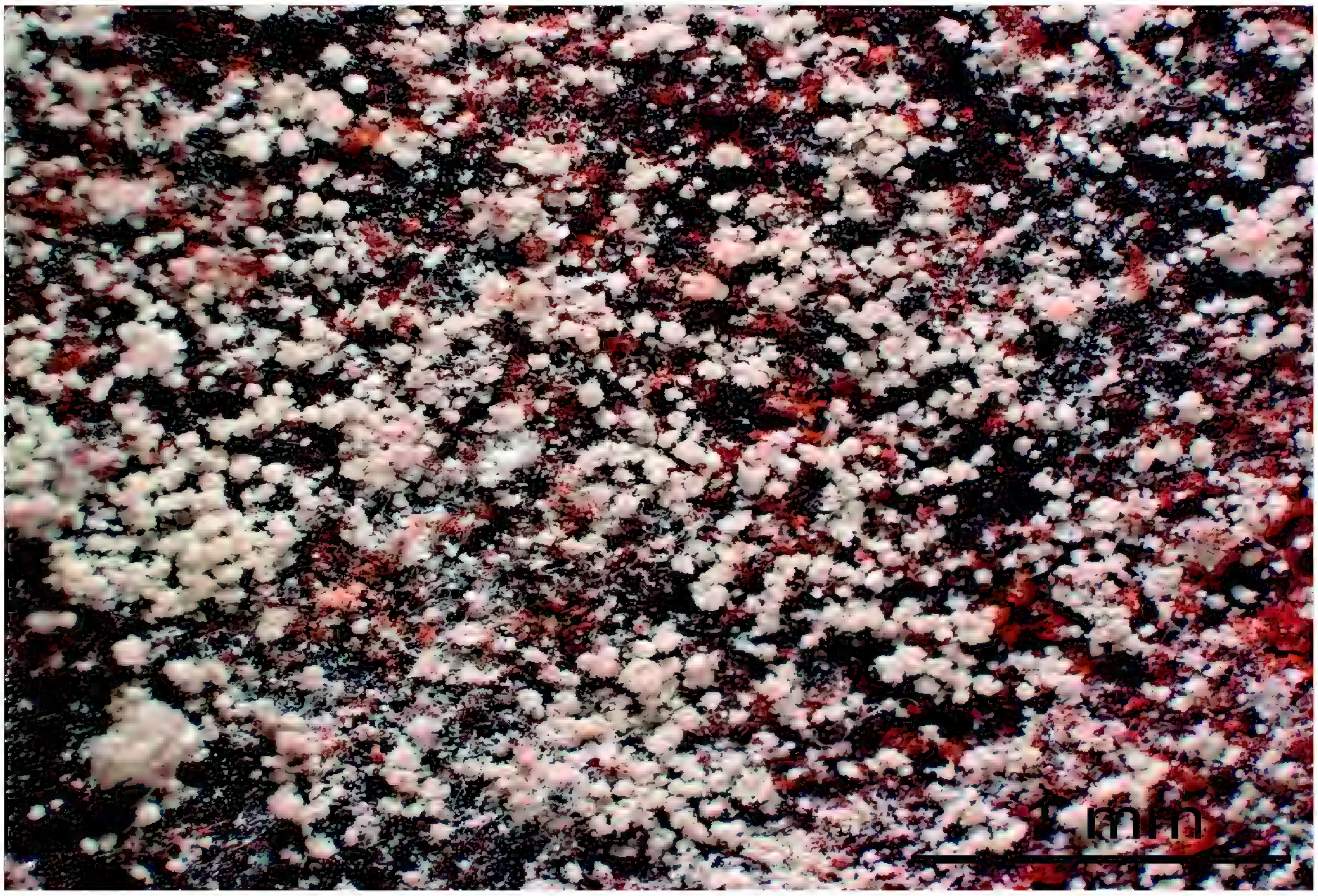


Figure 1 (top). *Lepraria lanata*, holotype. Figure 2 (bottom). *Lepraria salazinica*, holotype.

Etymology – The specific epithet (*salazinica*) refers to the presence of salazinic acid.

Chemistry. – Atranorin, salazinic acid, and angardianic/roccellic acid. Thallus: PD+ orange, K+ yellow becoming red, C−, KC−.

Ecology And Distribution. – Based on the two specimens available *L. salazinica* appears to be saxicolous on overhanging rock. Closely associated lichen species on the small pieces of rock in the herbarium packets included only fragments of a *Chrysothrix*. Its vertical distribution ranged from 570 to 1420−1450 m.

Discussion. – Salazinic acid is a rare substance in *Lepraria*, previously known only as a trace substance in *L. multiacida* Aptroot (Elix & Tønsberg 2004). *Lepraria salazinica* appears to be the first species of *Lepraria* known to produce salazinic acid as a major diagnostic substance. The thin, whitish thallus composed of rather small soredia and consoredia, and the presence of major quantities of salazinic acid are particularly diagnostic characters for *L. salazinica* and readily distinguish it from *L. multiacida.* The latter species is thick, with a ±black hypothallus and produces a range of substances including atranorin, zeorin, stictic acid and satellite compounds, strepsilin and related compounds in addition to salazinic acid (Aptroot 2002, Elix & Tønsberg 2004). At present the distribution of *L. salazinica* is not well known.

Additional specimens examined. **USA**. **Tennessee**. **Sevier Co.:** GSMNP, along Little River Rd/Little River, along tributary creek, 570 m, saxicolous under shaded overhang in creek ravine, 16.vi.2002, *T. Tønsberg 30789* (bg, nmw, ny).

Acknowledgements

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Opuscula Philolichenum, **4**: 55-56. 2007.

Dimelaena tenuis (Lichenized Ascomycota) new to North America, and *Xanthoparmelia pseudocongensis* new to Georgia, USA

Sean Q. Beeching[1]

ABSTRACT. – *Dimelaena tenuis* is reported as new to North America. *Xanthoparmelia pseudocongensis* is reported for the first time from Georgia.

In middle Georgia, near the Alabama state line, in Harris, Upson and Meriwether Counties is an area of mostly quartzite ridges, separated from the mountains of northern Georgia and the granitic outcrops of the Piedmont. Two lichens that I have not seen elsewhere in Georgia, a species of *Dimelaena* and a species of *Xanthoparmelia*, have been observed there on exposed rock.

After contemplating these lichens for years, I sent a specimen of the *Dimeleana* to Helmut Mayrhofer who kindly identified it as *D. tenuis* (Müll. Arg.) Mayrhofer & Wippel, a species not previously known from North America. It is a Southern Hemisphere species recorded from Australia, Africa and South America (Mayrhofer et al. 1996). *Dimelaena tenuis* has a C+ pink medulla and forms thalli one to five cm in diameter, olive to somewhat grayish in color, broken into black-bordered areoles in the center and narrow, lighter-colored, almost foliose lobes at the growing edges. Tiny black apothecia, 0.25 mm diameter, are common, often with a thalline margin. The spores are brown, two-celled, eight per ascus, and lacking wall thickenings.

James Lendemer identified the *Xanthoparmelia* associated with *D. tenuis* as the sub-tropical species *X. pseudocongensis* Hale, which has been found in the Ozarks, but has not been reported previously from southeastern North America (Nash & Elix 2004). This species forms large colonies of very small lobed yellow-green thalli that cling tightly to the rock. I saw no apothecia in the specimens I examined, but short isidia are produced in abundance towards the centers of the colonies, which are a darker moss green color. This central area of the thallus can appear crustose because it is areolate.

Both of these lichens seem to prefer well-lighted areas and steeply sloped rocks, though I note that Mayrhofer et al. (1996) report that *D. tenuis* occurs on more or less horizontal to slightly inclined surfaces. The best developed specimens are on a low quartzite cliff on the east bank of the Flint River on Dripping Rock Road in Upson County, but they are also found on rocks in the thin pine and oak woods on the ridges above. *Xanthoparmelia pseudocongensis* is the dominant lichen here, coloring the greater part of the exposed vertical surfaces bright green, while *D. tenuis* is much less obvious, occurring in small patches. These lichens are associated with *Buellia maculata* Bungartz, *Buellia mamillana* (Tuck.) W. A. Weber, *Chrysothrix chlorina* (Ach.) J.R. Laundon, *Diploschistes actinostomus* (Ach.) Zahlbr., *Dirinaria frostii* (Tuck.) Hale & Culb., *Flavoparmelia baltimorensis* (Gyelnik & Fóriss) Hale, *Lecanora oreinoides* (Körber) Hertel & Rambold, *Lepraria* spp., *Phlyctis* sp. and *Xanthoparmelia subramigera* (Gyelnik) Hale.

ADDITIONAL RECORDS (BOTH D. TENUIS AND X. PSEUDOCONGENSIS WERE FOUND TOGETHER): **USA**. **GEORGIA**. UPSON CO.: Spewrell's Bluff State Park, riverside cliff, 32.8556N 84.4737W, [NOT COLLECTED]. HARRIS CO.: FDR State Park, cliff, 32.8335N 84.8220W, *S.Q. Beeching s.n.* (HB. BEECHING #2056). UPSON CO.: Dripping Rock Road, rocks by Flint River, 32.9555N 84.85205W, *S.Q. Beeching s.n.* (HB. BEECHING #2254, HB. BEECHING #2255).

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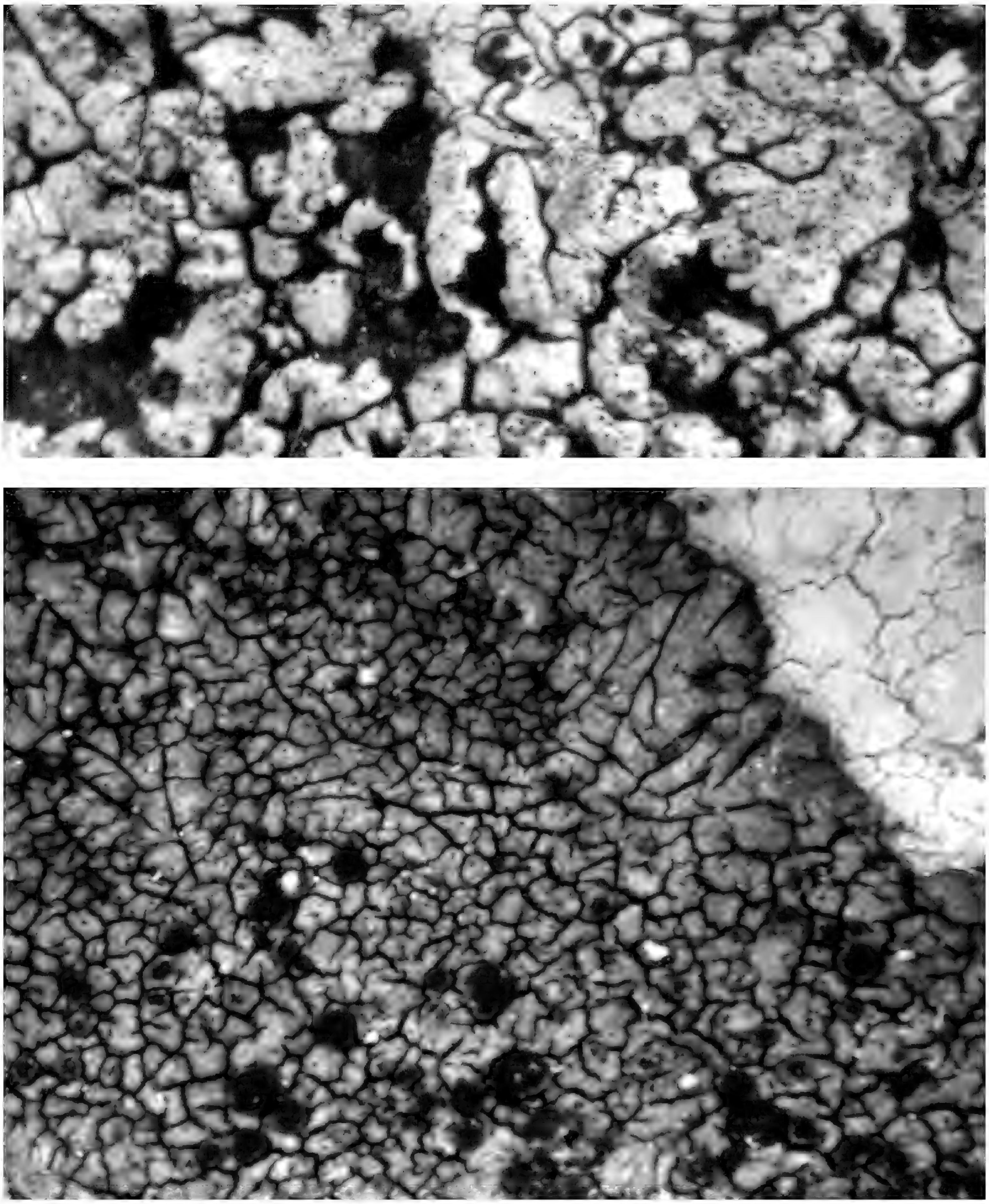

Figure 1 (top), *Xanthoparmelia pseudocongensis*. Figure 2 (bottom), *Dimelaena tenuis.* (Both based on Beeching s.n. (PH-hbL)).

ACKNOWLEDGEMENTS

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Opuscula Philolichenum, **4**: 57-68. 2007.

New taxa of lichens and lichenicolous fungi from the Ozark Ecoregion

Richard C. Harris[1] & Douglas Ladd[2]

ABSTRACT. – Three genera and species of lichens from the Ozark region of midcontinental North America are described as new to science and illustrated. *Pachyphysis ozarkana* (Porpidiaceae *s. lat.*) is widely distributed on exposed carbonate rocks, *Phoebus hydrophobius* (Roccellaceae) occurs on sheltered areas of massive carbonate bluffs, and *Xyleborus sporodochifer* (Stereocaulaceae) occurs on lightly shaded decorticate hardwoods logs and stumps in wooded uplands. A lichenicolous fungus, *Opegrapha diffracticola* (Roccellaceae), occurring on *Bacidia diffracta,* is also described and illustrated.

Introduction

The Ozark Highlands of interior North America occupy significant portions of Arkansas, Missouri and Oklahoma, and smaller areas of southeastern Kansas and southwestern Illinois. This ancient highland is characterized by rugged topography, high geologic diversity, and diverse habitats. Parts of the region have been continuously exposed for more than 225 million years, and have served as refugia during periods when other portions of interior North America were variously inundated by shallow seas or covered with glacial ice. The combination of antiquity, high habitat diversity, and influxes of biota from diverse realms has produced a diverse biota with a relatively high level of endemism among both plants and animals (The Nature Conservancy 2003, Zollner et al. 2005).

Although lichens are an abundant and pervasive component of Ozark biota, little was known about the composition and ecology of Ozark lichens until the authors and their colleagues began intensive systematic field work in the region in the early 1980's. These studies revealed an unexpectedly high diversity of lichens in the Ozarks, including numerous undescribed taxa. The taxa described here are part of an ongoing process of documenting the undescribed lichens and lichenicolous fungi from the Ozark Ecoregion. Other recently described species first noted in the Ozarks include *Hertelidea pseudobotryosa* R. C. Harris, Ladd & Printzen (Printzen & Kantvilas 2004), *Sphinctrina benmargana* Selva (2004), and *Punctelia missouriensis* Wilhelm & Ladd (1992). Part of the motivation for this publication is the imminent distribution of type material of two of these taxa (*Opegrapha diffracticola* and *Xyleborus sporodochifer*) in Lendemer, *Lichens of Eastern North America Exsiccati*.

The most striking characteristic about these three new genera is that each is somewhat anomalous in lacking closely related species and in some cases having characters previously unrecorded in their families. Although all were initially discovered in the Ozarks, and most of the known occurrences are Ozarkian, all occur outside of the Ozarks as well, usually occurring west and south of the region in a biogeographic pattern represented by other taxa, such as *Geocarpon minimum* and *Geococcyx californianus*. As is the case with most lichen taxa, knowledge of the distribution, abundance, and conservation status of these species is greatly hampered by the lack of adequate field work, especially in the Midwest and Great Plains.

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MATERIALS & METHODS

Representative specimens were analyzed with thin layer chromatography (TLC) using solvent A (Culberson and Kristinsson 1970). The morphology of specimens was examined using an Olympus BX51 microscope equipped with differential interference contrast. Measurements were obtained from hand-cut sections of the thallus mounted in water. Reagents are the standard ones routinely used and indicated with the usual abbreviations. Illustrations were prepared using an Olympus DP20 digital camera or MTI video setup and composed with Adobe Photoshop.

TAXONOMIC SECTION

1. *Opegrapha diffracticola* R. C. Harris & Ladd, sp. nov.

Plate 1.

Opegrapha lichenicola in *Bacidiae diffracticolae* thallo atque apotheciis crescens ascomatis saepe arcte aggregatis et ascosporis 3–septatis, 13–15 x 4–4.5 µm.

TYPE: **USA.** MISSOURI. MARIES CO.: Spring Creek Gap Conservation Area E of CR 340 (Old Hwy 63), ca. ½ mi N of US 63, 38°08'14"N, 91°48'08"W, 240–320m; floodplain forest, on *Bacidia diffracta* S. Ekman on bole of *Juniperus virginiana*, 4.xi.2002, *Harris 46555* (NY, holotype; isotypes to be distributed as Lendemer, *Lichens of Eastern North America Exsiccati V: 241*).

DESCRIPITION. – **Ascomata** (Figs 1,2) lirelliform, growing on thallus and apothecia of *Bacidia diffracta* S. Ekman without visible damage to the host thallus but ± deforming and darkening apothecia, sessile or slightly immersed, fusiform to ± oblong, undivided to once branched, 0.2–0.5 × 0.1–0.2 mm, solitary and scattered or aggregated into irregular clusters to 3 × 2 mm; disk concealed by appressed lips. **Exciple** (Fig 3) brown-black, greenish black in K, entire, thickened below, upper part to 50–60 µm thick. **Hypothecium** thin, colorless. **Epihymenium** yellow-brown (K–). **Hymenium** colorless, I+ patchily blue-green becoming orangish. **Asci** (Fig 4) clavate, with 8 ± biseriately arranged spores. **Ascospores** (Fig 5) remaining colorless, 3–septate, with thin halo, 13–15(–16) x 4.5–5.5 µm.

Pycnidia brown, ± globose, 50–100 µm across. **Conidia** (Fig 6) rod-shaped, 4.5–5.5 × 1.0–1.2 µm.

DISTRIBUTION & ECOLOGY. – *Bacidia diffracta* is widespread throughout the Ozarks in mesic woodlands, often associated with streams, and occasionally in drier woodland habitats. Substrates include lightly shaded boles of a variety of hardwoods, as well as commonly occurring on shaded boles of *Juniperus virginiana*. *Opegrapha diffracticola* probably occurs throughout the range of *Bacidia diffracta,* in the full range of habitats and substrates as the host. While most of the collections seen are from the Ozark region where *Bacidia diffracta* is common, *Opegrapha diffracticola* also occurs in Vermont and Wisconsin. While we have not borrowed the specimens of *Bacidia diffracta* cited by Ekman (1996), we assume such a search would locate additional records of the *Opegrapha*. As far as we know *Opegrapha diffracticola* is confined to *B. diffracta* and, interestingly, does not occur on the presumably closely related *B. polychroa* (Th. Fr.) Körber, even when the two taxa are adjacent on a single piece of bark [Harris 44745-C as *B. polychroa* (NY)].

DISCUSSION. – Knowledge of many groups of lichenicolous fungi is largely inaccessible to non–specialists. We thought that there were no previous records of lichenicolous *Opegrapha* on *Bacidia* until Jana Kocourková in her review pointed out the existence of *Opegrapha bacidiae* R. Sant. *nom. inval.* (1952) on foliicolous *Bacidia brasiliensis* (Müll. Arg.) Zahlbr. It was included in a key without subsequent English or Latin description. Matzer (1996) could find no material. It differs from *O. diffracticola* in having 5–septate ascospores. When the ascomata are closely aggregated, *Opegrapha diffracticola* is somewhat similar to older, multilocular ascomata of the lichenicolous *O. anomea* Nyl. group. It differs in that the ascomata are lirelliform from the beginning and not subspherical.

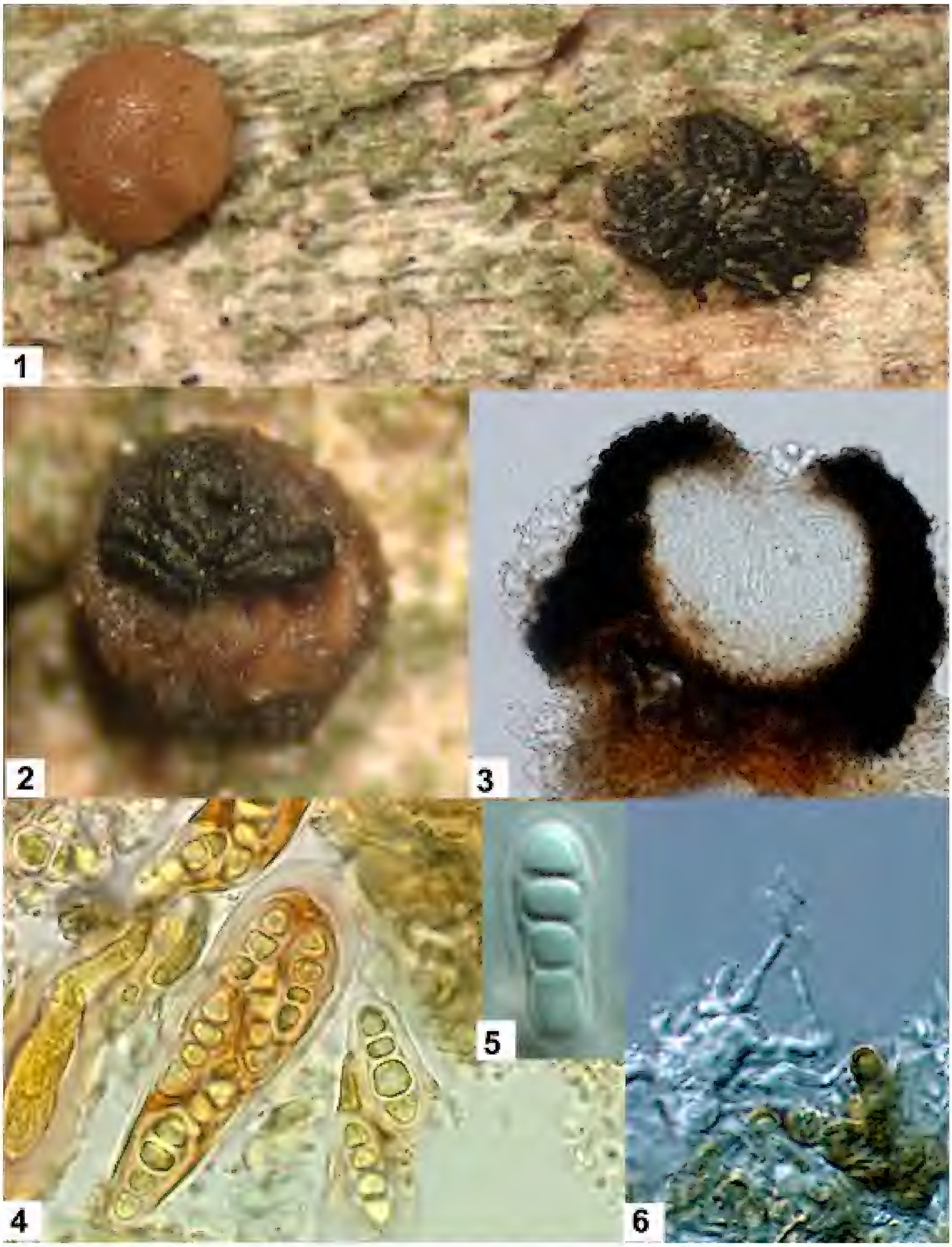

Plate 1. *Opegrapha diffracticola*. Figure 1. Ascomata on thallus of *Bacidia diffracta* (x 50). Figure 2. Ascomata on apothecium of *Bacidia diffracta* (x 70). Figure 3. Cross section of ascoma (x 650). Figure 4. Ascus and ascospores in IKI (x 1500). Figure 5. Ascospore (X2500). Figure 6. Conidiophores and conidia DIC (x 1500). All *Harris 46555*, Missouri, Maries Co., holotype, NY.

ADDITIONAL SPECIMENS EXAMINED[3]. – **ARKANSAS**. MADISON CO.: Madison County Wildlife Management Area, *Harris 44679* (NY); NEWTON CO.: Ozark National Forest, Upper Buffalo River Wilderness Area, *Wetmore 84861* (MIN, NY); SEARCY CO.: Buffalo National River, SE of Maumee South Campground, *Harris 51115-A* (NY); STONE CO.: Ozark National Forest, Gunner Pool Recreation Area, *Harris 21592-A* (NY). **MISSOURI**. BARRY CO.: Roaring River State Park, *Harris 44745-B, 44753* (NY); CRAWFORD CO.: Onondaga Cave State Park, *Buck 42707* (NY); CHRISTIAN CO.: Mark Twain National Forest, S of Chadwick Rd. at jct. of Monarch Road, *Harris 47619-A* (NY); GASCONADE CO.: Canaan Conservation Area, *Harris 52020* (NY); MARIES CO.: Spring Creek Gap Conservation Area, *Harris 46527, 46566* (NY); MORGAN CO.: Frank E. Carpenter Memorial Conservation Area, *Buck 48590, 48604A* (NY); OREGON CO.: Mark Twain National Forest, Falling Spring, *Harris 40523-A* (NY). **OKALHOMA**. CHEROKEE CO.: Cookson Wildlife Management Area, *Harris 48909-A* (NY), J. T. Nickel Family Nature and Wildlife Preserve (J5 Ranch), *Harris 44238-B, 44273-A* (NY). **VERMONT**. ADDISON CO.: Monkton, 10.xii.1879, *Farlow s.n.* (NY). **WISCONSIN**. VILAS CO.: Northern Highland State Forest, Trout Lake Conifer Swamp Natural Area, *Buck 41783A, Harris 45945-A* (NY).

2. ***Pachyphysis ozarkana* R. C. Harris & Ladd, *gen. et sp. nov.***

Plate 2.

Genus et species Porpidiacearum affinis super saxa calcarea crescens, singularis imprimis paraphysibus crassisimis, ad 10 µm diam. et ascosporis non halonatis globosis vel late ellipsoideis, 10–12 µm diam. vel 10–13 × 8–10 µm, etiam notabilis hymenio supero infuscato vel atrovirenti subtus violaceo suffuso, excipulo atque hypothecio atroviolaceo.

TYPE: **USA.** MISSOURI. BARRY CO.: Roaring River State Park, Roaring River Hills Wild Area along state highway F, 36°34'50"N, 93°50'00"W, dolomite glade with *Juniperus*, 3.xi.2000, *Harris 44707* (NY, holotype).

DESCRIPITION. – **Thallus** endolithic, not visible when on fine-grained dolomite/limestone (Ozarks), or traces of whitish epilithic thallus when on more pervious sandstone (Wisconsin); no substances detected by TLC. **Photobiont** chlorococcoid, not abundant, in a ± discontinuous layer; cells globose, 7–13 µm.

Apothecia (Fig 1) black, 0.5–1.2 mm across, usually with patches of diffuse white pruina, sessile (or in some Kansas specimens ± immersed, forming shallow pits in limestone), slightly to strongly constricted at the base, initially ± flat becoming swollen and hemispherical, initially with thick, slightly raised margin which is usually excluded with age; apothecial initials in pits in dolomite. **Exciple** (Fig 3) of radiating hyphae with large lumina embedded in well developed gelatinous matrix, ± colorless streaked with purple or with purple-black pigment masses or entirely purple, K+ red-purple; inner part often continuous with hypothecium and sometimes scarcely distinguishable from hypothecium. **Hypothecium** very gelatinous, dark brown to blackish purple, purple coloration more intense in K, red in HNO_3. **Epihymenium** grayish to olive or greenish (K–, N+ red) with numerous small colorless crystals on surface. **Hymenium** brownish (K– or K+ weakly purplish, N+ red-orange) in upper part, shading into and sometimes obscured by red-purple pigment (K+ intensely red-purple, N+ purple) in lower part (subhymenium?). **Paraphyses** of two kinds, some clavate, to ca. 10 µm thick (including thick gelatinous sheath); lumen toward base ca. 2 µm across, at top to ca. 7 µm across, others not or little expanded at tips with lumen 3–4 µm across, both types branched and anastomosed, sometimes so gelatinized as to be indistinguishable. **Ascus** (Fig 5) *Porpidia*-type, ± clavate, with eight, irregularly arranged spores. **Ascospores** (Fig 6) broadly ellipsoid to globose, not halonate, 10–13 × 8–10 µm or 10–12 µm across.

Pycnidia with blue-green wall, ca. 0.1 mm diameter, mostly immersed. **Conidia** (Fig 7) ± bacilliform although sometimes tapered at one or both ends, 6–8 × 1–1.5 µm.

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[3] Complete specimen citation data can be accessed at http://sciweb.nybg.org/science2/VirtualHerbarium.asp.

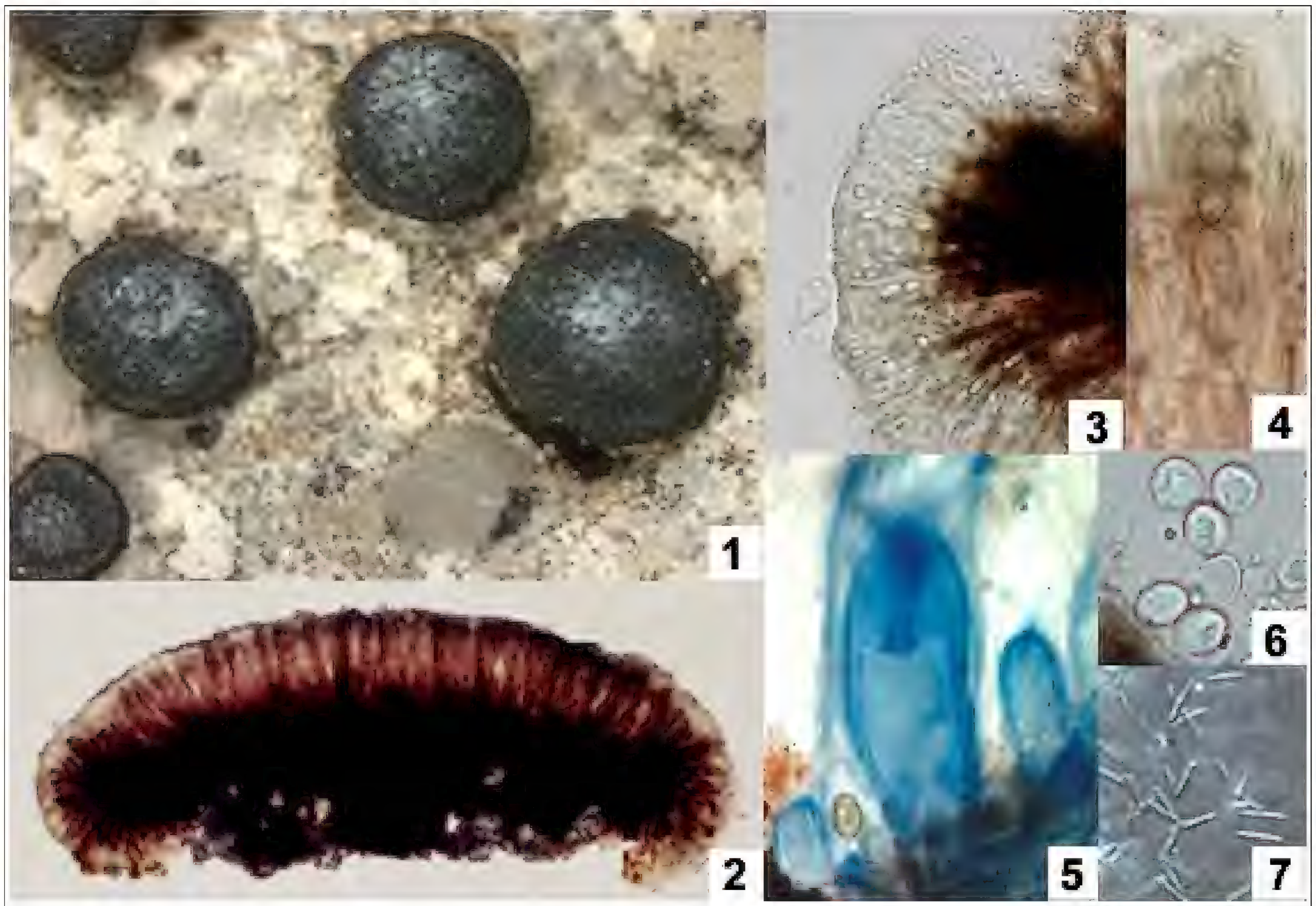

Plate 2. *Pachyphysis ozarkana* Figure 1. Habit (x 25, *Buck 32006* Missouri, Ozark Co., NY) Figure 2. Cross section of apothecium (x 120, *Ladd 24908* Missouri, Barry Co., NY) Figure 3. Cross section of exciple (x 300, *Ladd 24908* Missouri, Barry Co., NY) Figure 4. Paraphysis with thick gelatinous sheath (x 750, *Harris 40599* Missouri, Ozark Co., NY) Figure 5. Ascus KI (x 750, *Harris 44707*, holotype, Missouri, Barry Co., NY) Figure 6. Ascospores (x 650, holotype, *Harris 44707*, Missouri, Barry Co., NY) Figure 7. Conidia DIC (x 750, *Morse 11589*, Kansas, Coffey Co., NY)

Etymology. – *Pachyphysis* from pachys = thick and -physis from paraphysis, in reference to the distinctive thick paraphyses, *ozarkana* from region of the taxon's discovery and source of the majority of known collections.

Distribution & Ecology. – Frequent on exposed limestone and dolomite throughout the range of these substrates in the Ozarks, growing on both small pebbles and cobbles and on massive outcrops and boulders, usually on horizontal surfaces. The most typical habitat for this species in the Ozarks is dolomite glade. This species is known from carbonate bedrock regions of the Interior Low Plateau of Kentucky and Tennessee, westward through the Ozarks and into the Tallgrass and mixed grass regions of the central Great Plains of Kansas and Oklahoma, southwest into Texas. It is also known from the driftless area of southwestern Wisconsin, where it occurs on calcareous sandstone. It is interesting that all known sites for this species are in landscapes that remained unglaciated during the last glacial interval.

Discussion. – *Pachyphysis* is distinctive in the very thick paraphyses and the often globose ascospores. We have been unable to assign *Pachyphysis ozarkana* to any known genus of Porpidiaceae or match it with any known species of *Lecidea s. lat.* The ascus after KI treatment shows a definite dark staining 'tube' in the tholus (sometimes seen as a stack of rings), which seems to fit the *Porpidia* type ascus. It is primarily on this basis that *Pachyphysis* is assigned to the Porpidiaceae *s. lat.* Buschbom (2004) found that *Pachyphysis* was not included within a narrow Lecideaceae/Porpidiaceae clade but was in a clade with *Farnoldia* and *Melanolecia*, differing from them in paraphyses and apothecial pigmentation. This is interesting as both are strong calciphiles. One collection (*Buck 32057*) hosts a lichenicolous fungus tentatively identified as *Muellerella pygmaea* (Körber) D. Hawksw. var. *athallina* (Müll. Arg.) Triebel. Unfortunately this taxon has a wide host range and is not informative as to the familial position of the host.

In the field *Pachyphysis ozarkana* closely resembles *Lecidella stigmatea* (Ach.) Hertel & Leuckert but can be distinguished by the large apothecia with patchy white pruina. It can also be mistaken for less pruinose forms of *Sarcogyne regularis* Körber which lacks the highly colored tissues of *Pachyphysis* and has polysporous asci. Species of *Clauzadea* are rare in the Ozarks and lack pruina on the apothecia as well as lacking a grayish to olive or greenish epihymenium. Despite the paucity of lichen work in middle portions of North America, *Pachyphysis* is sufficiently common and widely distributed that it must have been collected earlier but it remains something of a puzzle as to what it might have been named. Alan Fryday in his review suggested misidentified specimens of *Lecidea phylliscina* Nyl. (= *Porpidia macrocarpa* (DC.) Hertel & Knoph) as a possibility to be investigated.

Additional Specimens Examined. – **Arkansas**. Carroll Co.: Along US 62 just NE of the White River, *Buck 38731* (NY); overgrown dolomite glade north of state highway 187, 1.0 mi. E of BM 1261, *Ladd 14754* (HB. LADD); Marion Co.: Jones Point Wild Life Management Area, *Harris 50957* (NY); Sharp Co.: Strawberry River Preserve, *Buck 40498* (NY). **Kansas**. Chase Co.: 6.5 mi N, 2.5 mi W Strong City, Tallgrass Prairie National Preserve, N part, *Morse 12335* (KANU); Clark Co.: 3 mi N, 12 mi W Ashland, Big Basin Preserve, *Morse 13472b* (KANU); Coffey Co.: 0.5 mi N, 1 mi E Waverly, SE corner of intersection of 26th & Underwood Rds., *Morse 11589* (KANU, NY, HB. LADD); Geary Co.: 4.25 mi S, 0.75 mi W Wreford, E side of Geary Co State Fishing Lake, *Morse 13923* (KANU, NY); Logan Co.: 16 mi S , 7 mi W Oakley, Smoky Valley Ranch (TNC preserve), *Morse* 12399 (KANU, NY); Montgomery Co.: ca 1 mi S, 7 mi E Elk City, N side of Elk City Lake, *Morse 14444* (KANU, NY); Riley Co.: Konza Prairie Biological Station units 13E, 13F, & 14F in vicinity of Nature Trail, *Morse 12608* (KANU), Konza Prairie Biological Station units 14D, E & F, *Morse 11041* (KANU); Rooks Co.: 0.75 mi S, 5.5 mi E Codell, "Devil's Den" area, *Morse 12215b* (KANU), Codell, *Morse 12256* (KANU); Russell Co.: 6 mi SW of Russell, *McGregor 475* (KANU); Wilson Wildlife Area, *Morse 12264* (KANU), 2 mi S, 2 mi E Fairport, *Morse 12238* (KANU); Trego Co.: 15 mi S, 4 mi W Ogallah, Cedar Bluff Reservoir, *Morse 12516* (KANU, NY). **Kentucky**. Bullitt Co.: Bernheim Arboretum and Research Forest, *Ladd 24033* (NY). **Missouri**. Carter Co.: Chilton Creek Preserve, *Ladd* 18680 (HB. LADD); Christian Co.: Mark Twain National Forest, N of Turkey Creek Road, 0.75 mi W of MO UU, *Harris 47711, Ladd 24908* (NY); Dent Co.: Indian Trail Conservation Area, *Buck 47446* (NY); Franklin Co.: Meramec State Park, Copper Hollow Natural Area, *Ladd 15911* (HB. LADD); Greene Co.: Wilson's Creek National Battlefield, *Buck 38341*(NY); Jefferson Co.: W-facing dolomite glade, E of Mammoth Creek Rd., *Harris 25408* (NY), Valley View Glades Natural Area, *Buck 45155, Harris 48177*-B (NY); Victoria Glade Preserve, *Harris 40394* (NY), *Ladd 12753* (HB. LADD); Maries Co.: Spring Creek Gap Conservation and Spring Creek Gap Glades Natural Area, *Buck 42755* (NY); Montgomery Co.: NW corner of Danville Conservation Area, *Buck 40587*, *Harris 45691*(NY); Ozark Co.: Mark Twain National Forest, Smoke Tree Scenic Lookout, *Buck 32006, 32008, 32787, Harris 40599, 40618, 41383, 41412* (NY), *Ladd 20200, 20208* (HB. LADD), N of Forest Service Road 147 (Glade Top Trail) in vicinity of parking area, *Harris 47468, 47473* (NY), along ridge E of Waterhole Hollow, *Amtoft 1026* (NY); Phelps Co.: Mark Twain National Forest, Bradford Branch Woodland Restoration Area, *Ladd 17588*, (HB. LADD); St. Louis Co.: Rockwoods Reservation, *Harris 45641* (NY); Stone Co.: Ashe Juniper Natural Area, *Buck 49448* (NY), *Morse 11897a, 11914* (KANU), Pilot Knob Conservation Area, *Morse 11959* (KANU); Taney Co.: Along W side of MO 125 ca. 0.9 mi N of Hercules Tower Rd., *Buck 32057, 32065, Harris 40673* (NY), *Ladd 20181* (HB. LADD); Hercules Glade Wilderness, Blair Ridge Trail, *Buck 44633* (NY), 3 mi NNE of US 160 9n Cross Timbers Road (CO Rd. 160/200), along trail to Coy Bald, *Harris* 47586 (NY), *Ladd 20845* (HB. LADD); Hercules Glades Wilderness Area. SE corner of Coy Bald, *Wetmore 84160* (MIN), *84187* (MIN, NY), Ruth and Paul Henning Conservation Area, Dewey Bald, *Buck 42930* (NY). Texas Co.: Gist Ranch Conservation Area, *Buck 47559, Harris 50259, 50286* (NY). **Oklahoma**. Osage Co.: Tallgrass Prairie Preserve, *Ladd 19872* (HB. LADD). **Tennessee**. Wilson Co.: Cedars of Lebanon State Park, *Harris 1294* (NY). **Texas**. Uvalde Co.: Sabinal, *Loring s.n., Morse 9204B* (KANU). **Wisconsin**. Sauk Co.: Baraboo Hills, Spring Green Reserve State Natural Area, *Harris 42181* (NY).

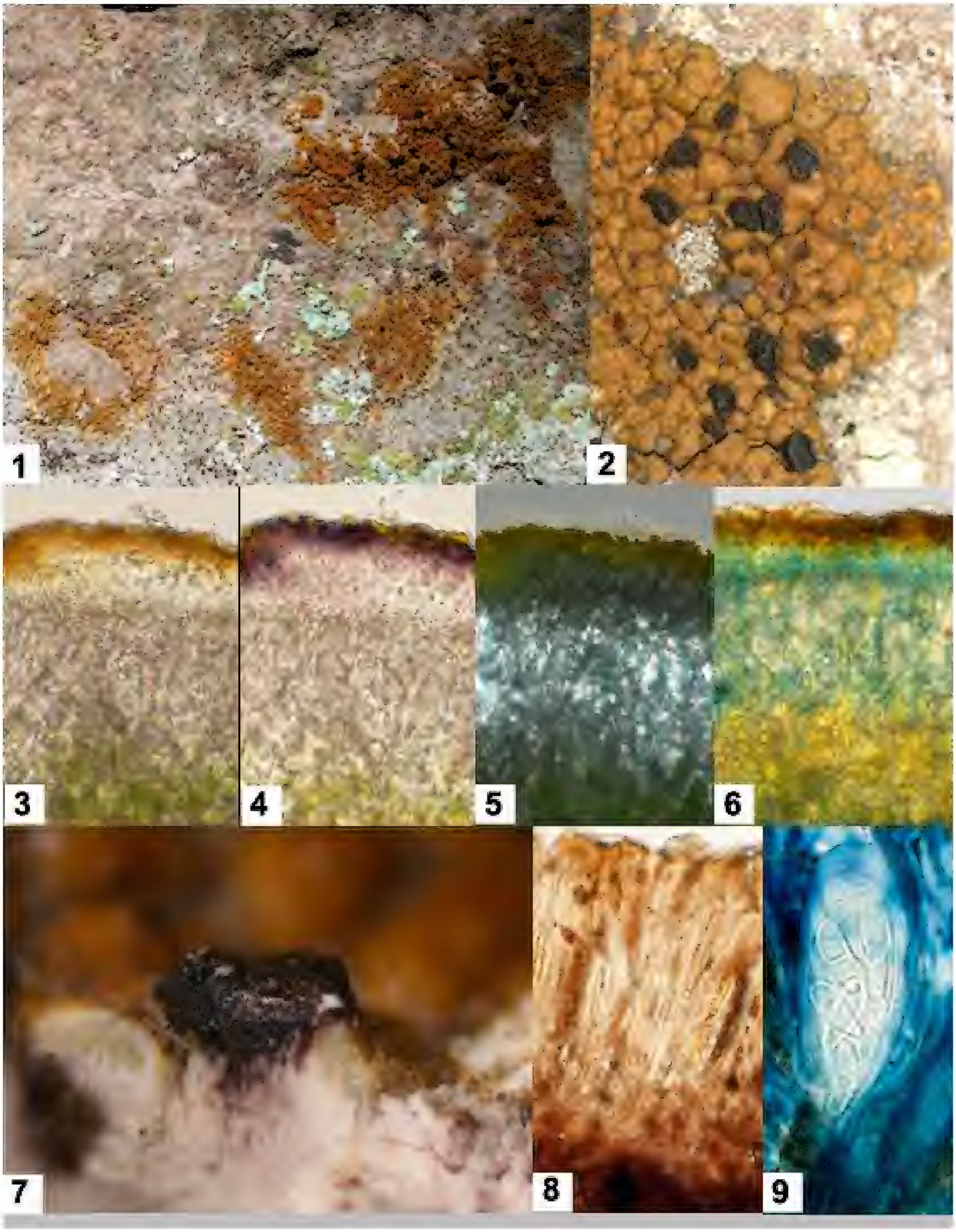

Plate 3. *Phoebus hydrophobius*. Figure 1. Habit, Oklahoma, Cherokee Co., *Buck 46537*, NY, photo Tony Kirchgessner). Figure 2. Habit (x 0.9, Arkansas, Izard Co., *Harris 45383*, NY). Figure 3. Cross section of thallus, in water (x360, Arkansas, Searcy Co., *Buck 48756*, holotype, NY). Figure 4. As fig. 3, in K. Figure 5. As fig. 3, polarized light. Figure 6. As in fig. 3, in I. Figure 7. Ascoma sectioned to show weak extension of base into thick medulla (x 60, Kansas, Cherokee Co., *Kramer 408*, NY). Figure 8. Cross section of hymenium (x 360, Arkansas, Searcy Co., *Buck 48756*, holotype, NY). Figure 9. (x 660, Arkansas, Searcy Co., *Buck 48756*, holotype, NY).

3. *Phoebus hydrophobius* R. C. Harris & Ladd, *gen. et sp. nov.*

Plate 3.

Genus et species Roccellacearum insignis ab omnibus aliis thallo placodioido aurantiaco K+ atroviolaceo, medullo supra et infra algarum stratum, corticis atque medullae hyphis I+ cyaneis et ascomatis opegraphoidibus differt.

TYPE: **USA.** ARKANSAS. SEARCY CO.: Buffalo National River, Tyler Bend along River View Trail from Collier Homestead Trailhead, 35°58'31"N, 92°45'56"W, dolomite bluffs in hardwood forest, on vertical dolomite bluff, 17.iv.2005, *Buck 48756* (NY, holotype).

DESCRIPITION. – **Thallus** (Figs 1,2) placodioid, composed of ± bullate or rugose, irregularly polyhedral or irregular areoles, light to dark or brownish orange, K+ violet-black (violet in section), not pruinose; areoles to ± 1.0 mm across and to 1.0 mm thick; prothallus absent. **Chemistry**: unknown pigments (2 yellow spots + 1 purple spot in solvent A). **Photobiont** *Trentepohlia*, cells subglobose to ellipsoid, 14–20 x 9–12 µm. **Epicortex** (Figs 3-6) gelatinous, orange pigmented above, ± colorless below, almost absent to ca. 10 µm thick, **Cortex** (Figs 3-6) cartilaginous, colorless, 20–30 µm thick, of tightly interwoven, highly gelatinized hyphae, I+ blue-green; orange pigment K+ violet, forming small deep violet granules. **Medulla** both above and below algal layer, white, filled with small colorless crystals obscuring sparse hyphae (not dissolving in K), K–, C–, KC–, PD–; upper part 40–60 µm thick , of loose, mostly anticlinal?, thick walled, I+ blue green hyphae; lower part thick, to ca. 1.0 mm high, white, I+ dark blue-green. **Algal layer** 75–100 µm thick.

Apothecia (Fig 2, 7) opegraphoid, black, sessile, on or between areoles, 0.5–1.2 mm across, initially ± rounded but often deformed, occasionally ± elongated, scattered or occasionally clustered or proliferating along margins, initially immersed in thallus; margin black, rarely orangish pruinose, raised, coarse, becoming sinuate in older ascomata; disk black, orangish pruinose. **Exciple** black, highly melanized, 45–70 µm thick. **Hypothecium** (Fig 7) dark brown, extending slightly into thallus, ca. 250 µm thick.. **Epihymenium** with sparse to dense orange granules, dark brown in K. **Hymenium** (Fig 9) tinted and streaked with light brown or orange-brown, with scattered colorless or orange crystals, upper part I+ dark blue-green, lower I+ red orange, ca. 100–110 µm high. **Paraphysoids** branched and anastomosed; tips not expanded. **Asci** (Fig 10) clavate, aborted/old ones with orangish brown to orange contents, with 8 spores mostly in two rows. **Ascospores** 3-septate, colorless, halonate, becoming brown and coarsely ornamented, 16–20 x 5–6.5 µm (excluding halo).

Pycnidia not found.

ETYMOLOGY. – Phoebus = Greek sun god, suggested by the orange "sun bursts" on rock in otherwise dark places, hydrophobius = water fearing, for its ecological preference.

DISTRIBUTION & ECOLOGY. – Restricted to massive calcareous substrates, typically on vertical faces of dolomite and limestone in areas of moderately high light intensity but protected from direct runoff or wetting. A typical habitat is on the face of a large bluff where a bedding plane of less resistant limestone has weathered more rapidly than the surrounding bedrock, creating a slightly recessed zone protected by the overhanging bedrock above. It occurs on both high light exposures and moderate shade. Because of the restricted habitat, this species is known from only a few sites in the southwestern Ozarks, as well as from nearby eastern Kansas and the Edwards Plateau of Texas, where it was discovered during the 2005 ABLS Foray. Attempts to relocate the population at the site Cherokee County, Kansas documented by Kramer in 1954 have been unsuccessful.

DISCUSSION. – In the field one is likely to mistake the orange thallus of *Phoebus* for an orange species of *Caloplaca* Th. Fr. Both also react magenta to purplish in K, but *Phoebus* has a much darker color reaction. When fertile, opegraphoid ascomata and ascospores easily distinguish *Phoebus*. Sterile material can be recognized by the very dark K-reaction and *Trentepohlia* photobiont. It is possible that *Phoebus* represents a lichenicolous *Opegrapha* on another sterile species of *Roccellaceae* but there is no hint of damage or two types of hyphae associated with apothecia. Within the Roccellaceae the placodioid thallus suggests some of the Southern Hemisphere species of *Roccellina* Darb. However, it does not seem closely related to that genus due to the unique thallus pigmentation and anatomy. As far as we can tell there is no other genus in the family with anthraquinone-like pigments in the thallus or a well developed medullary layer above and below the algal layer.

> Additional Specimens Examined. – **Arkansas**. Benton Co.: Hobbs State Park-Conservation Area, *Buck 49531* (NY), *Ladd 27526* (HB. LADD), *Morse 11962* (KANU); Carroll Co.: 10 mi W of Eureka Springs on U.S. Hwy. 62, *Kramer 451* (NY); massive southwest-facing dolomite bluff above White River near US highway 62, *Ladd 22612* (Ladd). Izard Co.: NE Corner of Devil's Knob-Devil's Backbone Natural Area, *Buck 40309, Harris 45383* (NY). **Kansas**. Cherokee Co.: 4 mi E of Baxter Springs on U.S. Hwy. 166, *Kramer 408* (NY). Montgomery Co.: 3 mi S, 1 mi E Independence, Elk City Lake, *Morse 2366* (KANU), N side of Elk City Lake, *Morse 14350* (KANU), *14465* (KANU, NY). **Missouri**. Barry Co.: Roaring River State Park, *Buck 38836* (NY). **Oklahoma**. Cherokee Co.: Cookson Wildlife Management Area, Bolin Hollow, *Buck 46537* (NY), *Ladd 25684* (HB. LADD). **Texas**. Travis Co.: Hamilton Pool Reserve, *Buck 49218, 49228* (NY).

4. *Xyleborus sporodochifer* R. C. Harris & Ladd, *gen. et sp. nov.*

Plate 4.

Genus et species lecideina singularis sporodochiorum anamorpho ad familiam Stereocaulacearum pertinent. Subsimilis *Hetelideae* sed hyphae parallelae arcte adnatae excipulo et strato externo excipuli hyalino differt.

TYPE: **USA.** Missouri. Barry co.: Mark Twain National Forest, Piney Creek Wilderness, north of Forest service Road #2185, 4.0 miles east of MO #39, Siloam Spring Trail, elev. 1200–1300 ft., 36°39'54"N, 93°36'23"W, oak-pine forest with chert residuum, on wood, 27.iii.2006, *Lendemer 6519* (NY, holotype; isotypes to be distributed as Lendemer, *Lichens of Eastern North America Exsiccati V: 228*).

Descripition. – Thallus (Figs 1,2) visible as paler areas on weathered decorticate logs and stumps (always *Quercus*?), patchy but often common on an individual log, superficial, scanty to abundant, pale tan to olivaceous, rough, of small (≤ 0.1 mm), areoles initially, sometimes remaining scattered but often coalescing and becoming ± continuous when thallus well developed; prothallus not evident; photobiont chlorococcoid, cells globose, 10–14 µm; unknown substance in low concentration or no lichen substances detected.

Apothecia (Fig 2) initially discoid, mostly becoming swollen, hemispherical to ± turbinate, constricted at base, sometimes weakly stipitate, 0.2–0.5(–0.8) mm across, 0.1–0.3 mm high; disk brown to dark brown or nearly black but often with thin whitish pruina (dissolving in K), sometimes appearing gray when pruina "immersed"; margin not raised, concolorous or slightly darker than disk, not evident in swollen apothecia. **Exciple** (Fig 3,4) almost colorless to pale brown outward, brown inward, 50–80 µm thick, of adnate radiating hyphae in colorless gel which forms a distinct external layer, sometimes containing ± linear pockets of colorless crystals (dissolving in K); inner exciple adjacent to hypothecium with radiating lines of amorphous, dark brown extra-hyphal pigment to densely pigmented as in hypothecium; excipular hyphae mostly ± expanded at tips (to 5.5 µm). **Epihymenium** almost colorless to brownish, with numerous small colorless crystals (dissolving in K). **Hymenium** usually tinted pale to medium brown or brown streaked, 50–80 µm high. **Paraphyses** (Fig 11) some slender, ca. 1–1.5 µm across, unbranched or branched once in upper part, not expanded or pigmented at tips, interspersed with few to many with expanded tips to 3.5 µm broad and with a thin brown cap. **Hypothecium** (Fig 3) dark brown, 50 µm high in young apothecia to ca. 200 µm in older, swollen apothecia (constituting bulk of apothecium), of very irregular and contorted hyphae, filled with dark brown extra-hyphal pigment and sometimes colorless crystals, K-intensifying. **Asci** (Fig 10) *Micarea*-type, clavate, with 8 irregularly arranged spores. **Ascospores** simple, fusiform to ovoid, colorless, 7–8.3–10.5 x 3.5–3.9–4.5 µm, without halo.

Sporodochia (Figs 5-7) white, hemispherical to subglobose, 0.1–1.5(–2) mm across, K+ pale yellow; sterile part of colorless, irregular, tightly entwined, short-celled hyphae on a base of looser, brown hyphae/bark; conidiogenous cells (Fig 8) poorly differentiated, short, irregular. **Conidia** (Fig 9) globose, 2.5–4 µm across, forming short, irregular chains/groups.

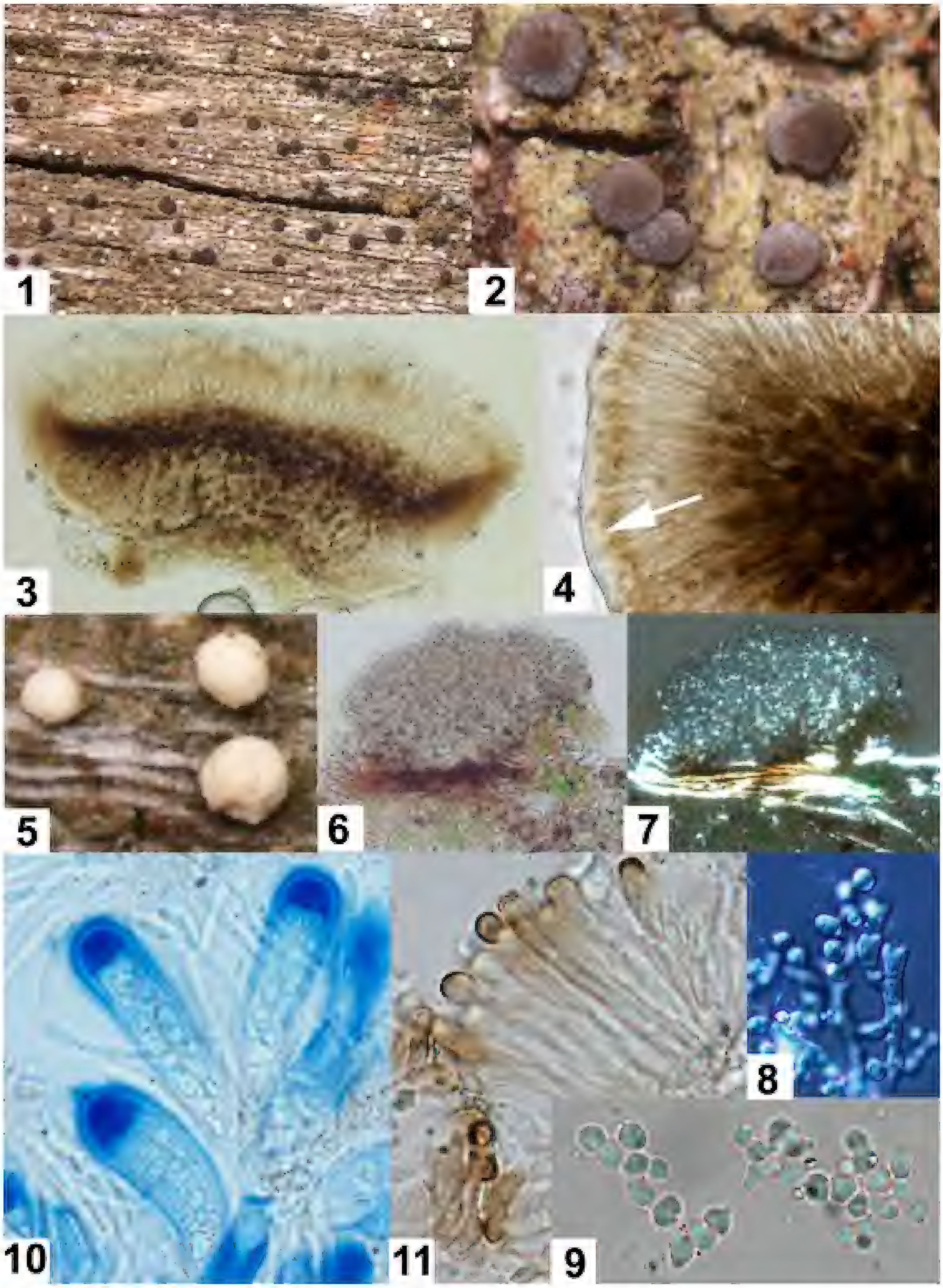

Plate 4. *Xyleborus sporodochifer*. Figure 1. Habit (x1.3) Figure 2. Pruinose apothecia (x 35) Figure 3. Cross section of apothecium (x 180) Figure 4. Detail of exciple with outer gelatinous layer (arrow) (x 670) Figure 5. Sporodochia (x 40) Figure 6. Cross section of sporodochium (x 160) Figure 7. Cross section of sporodochium polarized light (x 160) Figure 8. Conidia and conidiogenous cells? DIC (x 1200) Figure 9. Conidia DIC (x 120) Figure 10. Asci KI (x120) Figure 11. Paraphyses (x 1200). Figs. 1,3,5,6,7,8,9 (*Lendemer 6519*, Missouri, Barry Co., holotype); figs. 2,4,10 (*Buck 48942*, Oklahoma, Cherokee Co.); fig. 11 (*Ladd 20633*, Missouri, Shannon Co.)

Etymology. – *Xyleborus* = eating wood; *sporodochifer* = bearing sporodochia.

Distribution & Ecology. – *Xyleborus* occupies an unusually narrow niche. It is confined to weathered lignum near ground level in shaded woodlands, typically in dry-mesic to dry habitats, but less commonly in mesic areas. It appears to be restricted to intact woodlands. Most, and perhaps all, of the records are from *Quercus*, usually on fallen logs but occasionally on the side of stumps. The substrate is always weathered and/or decayed to the point beings rough and abundantly fissured and cross-checked with cracks, but generally not decayed to the point of punkiness. *Xyleborus* is common in the Ozarks with a single record from eastern Kansas.

Discussion. – As a consequence of the restricted circumscription of *Lecidea* Ach. *s. lat*., all but a single Ozark species of *Lecidea* have been placed in other genera or belong to as yet undescribed genera. Since the other two unnamed lecideoid groups in our area (the *cyrtidia–plebeja* group and the *hypnorum* group) are widespread and, perhaps, controversial as to their disposition, we restrict ourselves to describing this unique, near-endemic Ozark species.

As far as we are aware lichens with sporodochial anamorphs are extremely rare (*Micarea adnata* Coppins, Coppins, 1983; *Tylophoron* Stizenb., Tibell, 1982, Harris, 1995) as are synnematal anamorphs (*Dictyocatenulata* Finley & E. F. Morris, Lendemer & Harris, 2004). The vast majority produce pycnidia or hyphophores. While the presence of sporodochia (sometimes collected without accompanying apothecia) makes identification simple and provides additional justification for the new genus, the teleomorph is morphologically distinct. *Xyleborus* shares lignicolous substrate, apothecial coloration (external and internal) and *Micarea*-type ascus with species of *Hertelidea* Printzen & Kantvilas and "*Lecidea*" *plebeja* Nyl. The most obvious distinctions from both of the latter are found in the exciple, i.e., the colorless layer of gel on the outside and the rather narrow, closely adnate excipular hyphae with relatively unexpanded tips (differing from broader hyphae with distinctly expanded terminal cells). *Micarea adnata* differs in having the sporodochia composed of thin, cylindrical conidiogenous cells bearing small, simple conidia and in having apothecia with a poorly developed exciple.

> Additional Specimens Examined. – **Arkansas**. Baxter Co.: Ozark National Forest, Leatherwood Wilderness, *Buck 48888* (ny); Benton Co.: Hobbs State Park–Conservation Area, *Buck 46776* (ny), Ozark National Forest, Wedington Wildlife Management Area, *Buck 46334,46342*, *Harris 48768, 48770, 48780* (ny); Franklin Co.: Ozark National Forest, Boston Mountain Ranger District, Shores Lake, *Buck 49562* (ny), Ozark National Forest, south of FS 103 (White Ranch Mountain Road), in upper reaches of Deep Hollow, *Ladd 25868* (hb. ladd); Izard Co.: NE corner of Devil's Knob-Devil's Backbone Natural Area, *Buck 40253* (ny); Johnson Co.: Ozark National Forest, Katie Knob, *Buck 46735* (ny); Randolph Co.: Robert L. Haskins/Mud Creek Wildlife Management Area, *Buck 45527* (ny), *Ladd 25347* (Ladd); Searcy Co.: Buffalo National River, SE of Maumee South Campground, *Buck 48856, 48866* (ny); Sharp Co.: Strawberry River Preserve, *Buck 40467* (ny). **Kansas**. Douglas Co.: University of Kansas Ecological Reserves, Breidenthal Biological Reserve, *Morse 14542* (kanu). **Missouri**. Barry Co.: Mark Twain National Forest, Piney Creek Wilderness, *Buck 49892* (ny); Butler Co.: Mark Twain National Forest, Mud Creek Natural Area, *Harris 48491* (ny); Carter Co.: Peck Ranch Conservation Area, MOFEP site 9, 8 mi. NW of Van Buren, *Ladd 20484, 20491* (hb. ladd); Christian Co.: Mark Twain National Forest, Devreaux Ridge, *Harris 47660* (ny), S of Chadwick Road at jct of Monarch Road, 2.6 mi W of MO UU, *Buck 44545* (ny); Crawford Co.: Onondaga Cave State Park, Vilander Bluff Natural Area, *Buck 47410* (ny); Franklin Co.: Meramec State Park, *Buck 49597* (ny); Gasconade Co.: About 4.5 miles south of Owensville, along east side of Hwy EE, just north of Dry Fork Creek, *Wilhelm 17649* (MOR, ny); Madison Co.: Mark Twain National Forest, near N end of CR408/Forest Service Road 2604, *Buck 45285* (ny); Maries Co.: Spring Creek Gap Conservation Area and Spring Creek Gap Glades Natural Area, *Buck 42757* (ny); McDonald Co.: Huckleberry Ridge Conservation Area, *Buck 43033* (ny); Ozark Co.: Mark Twain National Forest, along ridge E of Waterhole Hollow, *Buck 44413, Harris 47391* (ny); Ste. Genevieve Co.: Magnolia Hollow Conservation Area, *Lendemer 6747* (ph-hbl, ny); Shannon Co.: Angeline Conservation Area, Lick Log Nature Trail, *Buck 48942* (ny), MOFEP site 1, in Carr's Creek State Forest, in north portion of unit, *Ladd 20633* (ny); Taney

Co.: Mark Twain National Forest, Hercules Glade Wilderness, Blair Ridge Trail, *Buck 44624* (NY), from Hercules Tower off MO 125 to Pole Hollow, *Buck 32038* (NY); Texas Co.: Barn Hollow Natural Area, *Harris 50377* (NY), Gist Ranch Conservation Area, *Buck 47552* (NY), Mark Twain National Forest, Slabtown River Access, *Buck 47613* (NY); Wayne Co.: Coldwater Conservation Area, *Buck 40075, 40083,* on side of oak stump, *Harris 45131* (NY).

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Opuscula Philolichenum, **4**: 69-80. 2007.

Lichens of Eastern North America Exsiccati, Fascicle V, Nos. 201-250.

James C. Lendemer[1]

ABSTRACT. – Data for the fifth fascicle, comprising the nos. 201 to 250, of *Lichens of Eastern North America Exsiccati* is presented. The exsiccat is distributed to ASU, B, BG, CANB, CHR, DOV, FH, GZU, H, HMAS, M, MIN, S, TSB, TNS, TU, UPS, and hb. Lendemer. The new combinations *Fissurina cypressi* (Müll. Arg.) Lendemer and *F. scolecitis* (Tuck.) Lendemer, are proposed.

Introduction

In conjunction with the preparator's work the lichen mycota of eastern North America he began the distribution of this exsiccat (*Lichens of Eastern North America Exsiccati*) from the Academy of Natural Sciences of Philadelphia (PH). This, the fifth fascicle in the series comprises the nos. 201-250 and is distributed in 20 sets on exchange to the following herbaria: ASU, B, BG, CANB, CHR, DOV, FH, GZU, H, HMAS, M, MIN, S, TSB, TNS, TU, UPS, and hb. Lendemer. Isotypes of the following taxa are included in this fascicle: *Lepraria normandinoides* Lendemer & R.C. Harris, *Opegrapha diffacticola* R.C. Harris & Ladd, and *Xyleborus sporodochifer* R. C. Harris & Ladd.

Fascicle V

201. *Dimelaena oreina* (Ach.) Norman
Det. James C. Lendemer – May 28, 2005

UNITED STATES OF AMERICA. PENNSYLVANIA. MONROE COUNTY.: State Game Lands no. 38, Hypsy Gap, east of Hypsy Gap Road. – elev. 1900 ft. - UTM 18 463505E 4540553N – Lat. 41° 00' 55"N, Long. 75° 26' 02"W – Rock exposures of glacial till, on south facing slope with *Quercus* and *Betula*. – On large boulder.

James C. Lendemer **#4193** & James A. Macklin May 2, 2005

202. *Physcia pumilior* R.C. Harris
Det. James C. Lendemer – May 28, 2005

UNITED STATES OF AMERICA. NEW JERSEY BURLINGTON COUNTY.: Wharton State Forest, south of Batsto, just west of the shore of the Batsto River and east of the Mullica River. - elev. 0-10 ft. - UTM 18 529932E 4387968N – Lat. 39° 38' 28"N, Long. 74° 39' 04"W - Low, moist, mixed pine (*Pinus rigida*) – oak (*Quercus*) forest with many small depressions, grading into typical dry pine – oak barrens. – On the branches of small shrubs in an open clearing.

James C. Lendemer **#4192** April 18, 2005

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203. *Phaeocalicium polyporaeum* (Nyl.) Tibell
Det. James C. Lendemer – May 28, 2005

UNITED STATES OF AMERICA. PENNSYLVANIA. LUZERNE COUNTY.: Nescopeck State Park, south of Honey Hole Road, on the lower north facing slopes of Mount Yeager. – elev. ca. 1100 ft. - UTM 18 423855E 4547249N – Lat. 41° 04' 22"N, Long. 75° 54' 23"W – Wet (many small streams and seeps) conifer (hemlock) dominated northern hardwood forest (*Acer, Betula, Fraxinus,* etc.) with abundant shaded sandstone ledges and exposed rock outcrops. – On a rotting birch (*Betula*).

James C. Lendemer **#4194** & James A. Macklin April 20, 2005

204. *Lepraria caesiella* R.C. Harris
Det. James C. Lendemer – May 28, 2005

UNITED STATES OF AMERICA. PENNSYLVANIA. LUZERNE COUNTY.: Nescopeck State Park, south of Honey Hole Road, on the lower north facing slopes of Mount Yeager. – elev. ca. 1100 ft. - UTM 18 423855E 4547249N – Lat. 41° 04' 22"N, Long. 75° 54' 23"W – Wet (many small streams and seeps) conifer (hemlock) dominated northern hardwood forest (*Acer, Betula, Fraxinus,* etc.) with abundant shaded sandstone ledges and exposed rock outcrops. – On the bark of a maple (*Acer*).

James C. Lendemer **#4195** & James A. Macklin April 20, 2005

205. *Fissurina cypressi* (Müll. Arg.) Lendemer, *comb. nov.* [Endnote 1]
Det. James C. Lendemer – July 14, 2005

UNITED STATES OF AMERICA. NORTH CAROLINA. CARTERET COUNTY.: Croatan National Forest, Pocosin Wilderness, ca. 8 miles west of Newport, just north of Mullis Road (SR #128), Mullis Swamp. - elev. 25-30 ft. - UTM 18 319512E 3849097N – Lat. 34° 46' 05"N, Long. 76° 58' 20"W – Swampy forest dominated by *Nyssa*, *Acer rubrum*, *Magnolia virginiana*, *Ilex*, and *Gordonia*. – On *Nyssa*.

James C. Lendemer **#4400** & Erin Tripp December 12, 2005

206. *Fissurina scolecitis* (Tuck.) Lendemer, *comb. nov.* [Endnote 2]
Det. James C. Lendemer – July 14, 2005

UNITED STATES OF AMERICA. NORTH CAROLINA. CARTERET COUNTY.: Croatan National Forest, Pocosin Wilderness, ca. 8 miles west of Newport, just north of Mullis Road (SR #128), Mullis Swamp. - elev. 25-30 ft. - UTM 18 319512E 3849097N – Lat. 34° 46' 05"N, Long. 76° 58' 20"W – Swampy forest dominated by *Nyssa*, *Acer rubrum*, *Magnolia virginiana*, *Ilex*, and *Gordonia*. – On *Gordonia* (?).

James C. Lendemer **#4399** & Erin Tripp December 12, 2005

207. *Parmotrema mellissii* (C.W. Dodge) Hale
Det. James C. Lendemer – September 5, 2005

UNITED STATES OF AMERICA. NORTH CAROLINA. TRANSYLVANIA COUNTY.: Gorges State Park, along Grassy Ridge Road, Grassy Ridge. – elev. 3150-3200 ft. - UTM 17 322550E 3885682N – Lat. 35° 05' 54"N, Long. 82° 56' 48"W – Mixed oak (*Quercus*) – hickory (*Carya*) forest with *Kalmia latifolia* understory. – On the bark of *Quercus alba.*

James C. Lendemer **#4130** & Erin Tripp August 9, 2005

208. *Pseudosagedia cestrensis* (Tuck. *ex* Michener) R.C. Harris
Det. James C. Lendemer – September 5, 2005

UNITED STATES OF AMERICA. ALABAMA. MARSHALL COUNTY.: Lake Guntersville State Park, peninsula on east shore of Lake Guntersville, ca. 1 mile southwest of Meltonville. – elev. 700-800 ft. - UTM 16 573694E 3810124N – Lat. 34° 25' 48"N, Long. 86° 11' 52"W – Mixed oak (*Quercus*) – pine (*Pinus*) forest on gentle east facing slope, bordering residential developments.

James C. Lendemer **#4131** August 13, 2005

209. *Opegrapha* sp.
Det. James C. Lendemer – September 5, 2005

UNITED STATES OF AMERICA. ALABAMA. MARSHALL COUNTY.: Lake Guntersville State Park, peninsula on east shore of Lake Guntersville, ca. 1 mile southwest of Meltonville. – elev. 700-800 ft. - UTM 16 573694E 3810124N – Lat. 34° 25' 48"N, Long. 86° 11' 52"W – Mixed oak (*Quercus*) – pine (*Pinus*) forest on gentle east facing slope, bordering residential developments.

James C. Lendemer **#4132** August 13, 2005

210. *Arthonia rubella* (Fée) Nyl.
Det. James C. Lendemer – September 5, 2005

UNITED STATES OF AMERICA. ALABAMA. MARSHALL COUNTY.: Lake Guntersville State Park, peninsula on east shore of Lake Guntersville, ca. 1 mile southwest of Meltonville. – elev. 700-800 ft. - UTM 16 573694E 3810124N – Lat. 34° 25' 48"N, Long. 86° 11' 52"W – Mixed oak (*Quercus*) – pine (*Pinus*) forest on gentle east facing slope, bordering residential developments.

James C. Lendemer **#4133** August 13, 2005

211. *Hypotrachyna showmanii* Hale
Det. James C. Lendemer – September 24, 2005

UNITED STATES OF AMERICA. PENNSYLVANIA. PIKE COUNTY.: Delaware Water Gap National Recreation Area, Pocono Environmental Education Center, east of access road. – elev. ca. 750 ft. - UTM 18 507598E 4557406N – Lat. 41° 10' 05"N, Long. 74° 54' 34"W. - Upland pine (*Pinus*) - oak (*Quercus*) dominated forest with exposed east facing slopes, small maple (*Acer*) swamp with *Sphagnum* drainage, and shale barrens forested by *Juniperus* and *Pinus.* – Locally abundant on the branches of a stand of hemlocks (*Tsuga canadensis*).

James C. Lendemer **#4934** September 16, 2005

212. *Trapelia placodioides* Coppins & P. James
Det. James C. Lendemer – September 24, 2005

UNITED STATES OF AMERICA. PENNSYLVANIA. MONROE COUNTY.: Delaware Water Gap National Recreation Area, ca. 2 miles south of Bushkill, ca. 1 mile southeast of Shoemakers, Community Drive Wetlands. - elev. ca. 700-800 ft. - UTM 18 499427E 4547474N – Lat. 41° 04' 43"N, Long. 75° 00' 24"W. - Drained portions bordered by *Alnus,* and swampy portions primarily with *Acer* and *Fraxinus*, bisected by Hogback Ridge forested with dense hemlocks (*Tsuga*) and large semi-calcareous rock exposures and boulders. – On the remnants of a rock wall on edge of wetland.

James C. Lendemer *et al.* **#4935** September 17, 2005
w/ participants of 30th A. Leroy Andrews Foray

213. *Chrysothrix flavovirens* Tønsberg *s. lat.*
Det. James C. Lendemer – September 24, 2005

UNITED STATES OF AMERICA. PENNSYLVANIA. MONROE COUNTY.: Delaware Water Gap National Recreation Area, ca. 2 miles south of Bushkill, ca. 1 mile southeast of Shoemakers, Community Drive Wetlands. - elev. ca. 700-800 ft. - UTM 18 499427E 4547474N – Lat. 41° 04' 43"N, Long. 75° 00' 24"W. - Drained portions bordered by *Alnus,* and swampy portions primarily with *Acer* and *Fraxinus*, bisected by Hogback Ridge forested with dense hemlocks (*Tsuga*) and large semi-calcareous rock exposures and boulders. – On the bark of a hemlock (*Tsuga canadensis*) on the shore of a small maple (*Acer*) swamp.

James C. Lendemer *et al.* **#4936** September 17, 2005
w/ participants of 30th A. Leroy Andrews Foray

214. *Brigantiaea leucoxantha* (Spreng.) R. Sant. & Hafellner
Det. James C. Lendemer – January 22, 2006

UNITED STATES OF AMERICA. NORTH CAROLINA. TRANSYLVANIA COUNTY.: Gorges State Park, along road between Bearwallow River and Toxaway River. – elev. 1600-1800 ft. – UTM 17 326056E 3883646N - Lat. 35° 04' 50"N, Long. 82° 54' 29"W – Mixed hardwood-coniferous forest (*Liriodendron, Acer, Tsuga, Pinus strobus,* and *Quercus alba*). – On the bark of *Quercus alba*.

James C. Lendemer **#5639** & Erin Tripp August 12, 2005

215. *Rhizocarpon grande* (Flörke ex Flot.) Arnold
Det. James C. Lendemer – January 22, 2006

UNITED STATES OF AMERICA. PENNSYLVANIA. MONROE COUNTY.: Tobyhanna State Park, Kistler Ledge. – elev. 2200-2215 ft. - UTM 18 468696E 4564243N – Lat. 41° 13' 44"N, Long. 75° 22' 25"W – Exposed ridge-top with extensive rock exposures and ledges in full sun, with small shrubs and sparse *Betula*. – On rock ledges.

James C. Lendemer **#5660** & James A. Macklin April 21, 2005

216. *Canoparmelia crozalsiana* (de Lesd.) Elix & Hale
Det. James C. Lendemer – March 17, 2007

UNITED STATES OF AMERICA. PENNSYLVANIA. CHESTER COUNTY.: Ker-Feal, 2.4 km south-southeast of Chester Springs, Malvern Quad. – elev. 400-450 ft. - UTM 18 448224E 4436197N – Lat. 40° 04' 28"N, Long. 75° 36' 26"W – Open fields with occasional boulders, mixed hardwood forest (*Quercus, Fraxinus, Acer*) forest in stream ravine with rock outcrops, and old stone walls around house. – On the bark of a large maple (*Acer*).

James C. Lendemer **#8702** & Alfred E. Schuyler March 15, 2007

217. *Lecanora* sp.
Det. James C. Lendemer – May 9, 2006

UNITED STATES OF AMERICA. PENNSYLVANIA. CARBON COUNTY.: Lehigh Water Gap Superfund Site, W-side of Lehigh Gap, above railroad grade, along transect line, SE of Palmerton, Lehighton Quad. – elev. 600 ft. - UTM 18 446864E 4515813N – Lat. 40° 47' 30"N, Long. 75° 37' 47"W – Rocky north-facing slope, contaminated by cadmium, lead, and zinc. – On *Quercus*.

James C. Lendemer **#6766** & Natalie Howe May 2, 2006

218. *Porpidia albocaerulescens* (Wulfen) Hertel & Knoph
Det. James C. Lendemer – May 9, 2006

UNITED STATES OF AMERICA. PENNSYLVANIA. MONROE COUNTY.: Delaware Water Gap National Recreation Area, Mount Minsi, ~1 mile south of Delaware Water Gap, west of Delaware River, Stroudsburg Quad. – elev. 800-1200 ft. - UTM 18 488596E 4534700N – Lat. 40° 57' 48"N, Long. 75° 08' 08"W – Mixed hardwood forest (*Fraxinus, Acer, Quercus, Carya*) with *Rhododendron* thickets and sandstone barrens, on north-facing slope. – On shaded sandstone boulders.

James C. Lendemer **#6870** & Natalie Howe May 3, 2006

219. *Rinodina tephraspis* (Tuck.) Herre
Det. James C. Lendemer – May 9, 2006

UNITED STATES OF AMERICA. PENNSYLVANIA. MONROE COUNTY.: Delaware Water Gap National Recreation Area, Mount Minsi, ~1 mile south of Delaware Water Gap, west of Delaware River, Stroudsburg Quad. – elev. 800-1200 ft. - UTM 18 488596E 4534700N – Lat. 40° 57' 48"N, Long. 75° 08' 08"W – Mixed hardwood forest (*Fraxinus, Acer, Quercus, Carya*) with *Rhododendron* thickets and sandstone barrens, on north-facing slope. – On shaded sandstone boulder.

James C. Lendemer **#6871** & Natalie Howe May 3, 2006

220. *Lepraria normandinoides* Lendemer & R.C. Harris
Det. James C. Lendemer – May 25, 2006

UNITED STATES OF AMERICA. NORTH CAROLINA. HENDERSON COUNTY.: Pisgah National Forest, North Mills River Recreation Area, along North Mills River Road (Forest Service Road 1206), ca. 7 miles northwest of NC 191, Dunsmore Mountain Quad. – elev. 2300 ft. - UTM 17 351183E 3919191N – Lat. 35° 24' 18"N, Long. 82° 38' 20"W – Hardwood (*Acer, Carya, Quercus*) – hemlock (*Tsuga*) forest on north-facing slope. – On *Acer*.

James C. Lendemer *et al.* **#7110** April 30, 2006
w/ participants of 2006 Bloomquist Foray

221. *Lepraria normandinoides* Lendemer & R.C. Harris
Det. James C. Lendemer – May 25, 2006

ISOTYPE

UNITED STATES OF AMERICA. NORTH CAROLINA. TRANSYLVANIA COUNTY.: Nantahala National Forest, Shower Falls, along Cold Mountain Road, south slope of Panthertail Mountain, Lake Toxaway Quad. – elev. 3500 ft. - UTM 17 320217E 3892509N – Lat. 35° 09' 34"N, Long. 82° 58' 26"W – Small roadside waterfall over gneiss. – On gneiss overhang.

James C. Lendemer *et al.* **#7001** April 29, 2006
w/ participants of 2006 Bloomquist Foray

222. *Cladonia verticillata* (Hoffm.) Schaer.
Det. James C. Lendemer – May 25, 2006

UNITED STATES OF AMERICA. NORTH CAROLINA. JACKSON COUNTY.: Nantahala National Forest, Panthertown Valley, Blue Ridge between Cold Mountain Gap and Panthertown Creek, Big Ridge Quad. – elev. 3800-4000 ft. - UTM 17 316798E 3891812N – Lat. 35° 09' 09"N, Long. 83° 00' 41"W – Mixed hardwood forest (*Acer, Quercus, Caya, Juglans, Nyssa*) on north-west facing slope, with several small streams/seeps. – On organic matter in open area under powerline.

James C. Lendemer *et al.* **#6994** April 29, 2006
w/ participants of 2006 Bloomquist Foray

223. *Lobaria pulmonaria* (L.) Hoffm.
Det. James C. Lendemer – May 25, 2006

UNITED STATES OF AMERICA. NORTH CAROLINA. JACKSON COUNTY.: Nantahala National Forest, Panthertown Valley, Blue Ridge between Cold Mountain Gap and Panthertown Creek, Big Ridge Quad. – elev. 3800-4000 ft. - UTM 17 316798E 3891812N – Lat. 35° 09' 09"N, Long. 83° 00' 41"W – Mixed hardwood forest (*Acer, Quercus, Caya, Juglans, Nyssa*) on north-west facing slope, with several small streams/seeps. – On *Quercus*.

James C. Lendemer *et al.* **#6995** April 29, 2006
w/ participants of 2006 Bloomquist Foray

224. *Parmeliella appalachensis* P.M. Jørg. s. lat.
Det. James C. Lendemer – May 25, 2006

UNITED STATES OF AMERICA. NORTH CAROLINA. MACON COUNTY.: Highlands, Ravenel Park, trail to Sunset Rock, Highlands Quad. – elev. ca. 4000 ft. - UTM 17 300358E 3880440N – Lat. 35° 02' 49"N, Long. 83° 11' 20"W – *Rhododendron*-hemlock-hardwood forest with gneissic exposures. – On *Quercus*.

James C. Lendemer *et al.* **#7066** April 30, 2006
w/ participants of 2006 Bloomquist Foray

225. *Cladonia robbinsii* A. Evans
Det. James C. Lendemer – May 29, 2006

UNITED STATES OF AMERICA. MISSOURI. GASCONADE COUNTY.: Canaan Conservation Area, vicinity of parking area at end of Bock Road (CR 434) / Boettcher Road (CR 435), 2 miles east of State Road A, ca. 3 miles north of Bland, Owensville West Quad. – elev. 800 ft. - UTM 15 623448E 4244052N– Lat. 38° 20' 10"N, Long. 91° 35' 15"W– Hardwood-juniper forest along Sulphur Branch with sandstone outcrops and mud barren. – On soil and organic matter in barren.

James C. Lendemer *et al.* **#6071** March 25, 2006
w/ William R. Buck & Richard C. Harris

226. *Lepraria normandinoides* Lendemer & R.C. Harris
Det. James C. Lendemer – May 29, 2006

UNITED STATES OF AMERICA. MISSOURI. LAWRENCE COUNTY.: Fall Hollow Gorge along small tributary of Goose Creek, ~0.3 miles west of Highway O, ~0.5 miles north of Highway #174, Halltown Quad. – elev. 1250 ft. - UTM 15 443248E 4109084N – Lat. 37° 07' 35"N, Long. 93° 38' 20"W – Pennsylvanian channel sandstone ravine and adjacent glade. – On sandstone boulders on edge of ravine.

James C. Lendemer *et al.* **#6183** March 27, 2006
w/ William R. Buck, Richard C. Harris & Doug Ladd

227. *Placidium arboreum* (Schw. *ex* E. Michener) Lendemer
Det. James C. Lendemer – May 29, 2006

UNITED STATES OF AMERICA. MISSOURI. JEFFERSON COUNTY.: Don Robertson Property, north of Sand Cut Road, ~1.2 miles east of State Road NN, along tributary to La Barque Creek, "Club Moss Hollow", Pacific Quad. – elev. 550-750 ft. - UTM 15 701557E 4252350N– Lat. 38° 23' 48"N, Long. 90° 41' 31"W– Deep acidic sandstone ravine with calcareous seepages below, and upland mixed hardwood forests with sandstone ledges above. – On the bark of an oak (*Quercus*), on an upland sandstone ledge.

James C. Lendemer *et al.* **#7121** March 24, 2006
w/ Bruce Allen, William R. Buck & Richard C. Harris

228. *Xyleborus sporodochifer* R. C. Harris & Ladd
Det. James C. Lendemer – May 29, 2006

ISOTYPE

UNITED STATES OF AMERICA. MISSOURI. BARRY COUNTY.: Mark Twain National Forest, Piney Creek Wilderness, north of Forest Service Road #2185, 4.0 miles east of MO #39, Siloam Spring Trail, Cape Fair Quad. – elev. 1200-1300 ft. - UTM 15 445810E 4057882N – Lat. 36° 39' 54"N, Long. 93° 36' 23"W – Oak-pine forest with chert residuum. – On wood.

James C. Lendemer *et al.* **#6519** March 27, 2006
w/ William R. Buck, Richard C. Harris, & Doug Ladd

229. *Cladonia fimbriata* (L.) Fr.
Det. James C. Lendemer – July 16, 2006

UNITED STATES OF AMERICA. NEW YORK. ESSEX COUNTY.: Northeast of Heart Lake, low east-facing slopes of Mt. Jo. – elev. 650-700 ft. – UTM 18 582927E 4893307N – Lat. 44° 11' 18" N, Long. 73° 57' 45" W - Road bank, in a mixed northern hardwood forest (*Acer, Fraxinus, Juglans, Betula*) with low coniferous areas and shaded rock outcrops. - On bryophytes and organic matter.

James C. Lendemer *et al.* **#7121** September 17, 2004
w/ participants of 2004 A. Leroy Andrews Foray

230. *Cladonia diversa* Asperges
Det. James C. Lendemer – July 28, 2006

UNITED STATES OF AMERICA. NEW JERSEY. BURLINGTON COUNTY.: Rutgers Pinelands Field Station, 1.25 miles north of Four Mile Circle (NJ Route #70), ~2 miles south of New Lisbon, Browns Mills Quad. – elev. 100 ft. - UTM 18 534520E 4418512N – Lat. 39° 54' 58"N, Long. 74° 35' 46"W – Pine (*Pinus rigida*) – oak (*Quercus*) forest with ericaceous understory. – On sandy soil.

James C. Lendemer *et al.* **#7139** July 1, 2006
w/ Andy Moroz & Andrew R. Suggs

231. *Protoblastenia rupestris* (Scop.) J. Steiner
Det. James C. Lendemer – August 1, 2006

UNITED STATES OF AMERICA. OHIO. ADAMS COUNTY.: Chaparral Prairie State Nature Preserve, south of West Union, ~1.75 miles southeast of Cave Hill, West Union Quad. – elev. 900 ft. - UTM 17 276472E 4302118N – Lat. 38° 50' 22"N, Long. 83° 34' 31"W – Remnant prairie on alkaline soil with mixed hardwood (*Acer, Carya, Quercus*) – juniper (*Juniperus communis*) forest, and controlled burn areas. – On small pebbles in open areas.

James C. Lendemer *et al.* **#7254** May 22, 2006
w/ participants of 15th Tuckerman Workshop

232. *Cladonia verticillata* (Hoffm.) Schaer.
Det. James C. Lendemer – August 1, 2006

UNITED STATES OF AMERICA. OHIO. SCIOTO COUNTY.: Shawnee State Forest, at southern junction of Forest Service Roads 3 & 6, ~1.6 miles west of Bear Creek Lake, Otway Quad. – elev. 1100 ft. - UTM 17 308311E 4294275N – Lat. 38° 46' 35"N, Long. 83° 12' 24"W – Eroded sandstone roadbank and adjacent oak (*Quercus*) – hickory (*Carya*) woodland. – On soil and organic matter.

James C. Lendemer *et al.* **#7223** May 21, 2006
w/ participants of the 15th Tuckerman Workshop

233. *Phaeophyscia leana* (Tuck.) Essl.
Det. James C. Lendemer – August 1, 2006

UNITED STATES OF AMERICA. OHIO. ADAMS COUNTY.: Appalachia Nature Preserve, McKee Hollow, small tributary east of the Ohio River, Concord Quad. – elev. 500 ft. - UTM 17 287537E 4286408N – Lat. 38° 42' 03"N, Long. 83° 26' 36"W – Riparian forest periodically inundated by backwaters from the Ohio River. – On a fallen tree.

James C. Lendemer *et al.* **#7224** May 20, 2006
w/ participants of the 15th Tuckerman Workshop

234. *Trapelia glebulosa* (Sm.) J.R. Laundon
Det. James C. Lendemer – August 1, 2006

UNITED STATES OF AMERICA. OHIO. SCIOTO COUNTY.: Shawnee State Forest, Copperhead Lookout Tower, 0.75 miles south of Bear Creek Lake, Otway Quad. – elev. 1200 ft. - UTM 17 311342E 4293802N – Lat. 38° 46' 22"N, Long. 83° 10' 18"W – Open oak woodland. – On sandstone.

James C. Lendemer *et al.* **#7253** May 21, 2006
w/ participants of the 15th Tuckerman Workshop

235. *Lecidea cyrtidia* Tuck.
Det. James C. Lendemer – August 1, 2006

UNITED STATES OF AMERICA. PENNSYVANIA. BEDFORD COUNTY.: Cumberland Valley Township, Buchanan State Forest, Pleasant Valley, along Blankley Road, 1.3 mi NE of CR 3011, Beans Cove Quad. – elev. 1700-1800 ft. - UTM 17 712221E 4436828N – Lat. 40° 03' 18"N, Long. 78° 30' 43"W – West-facing slope with granite exposures, granite/sandstone boulders, and mixed hardwood (*Tilia, Fraxinus, Quercus, Betula*) forest. – On a large sandstone boulder near top of ridge.

James C. Lendemer *et al.* **#7336** May 18, 2006
w/ William R. Buck, Richard C. Harris, Scott LaGreca, and Natalie Howe

236. *Punctelia missouriensis* G. Wilh. & Ladd
Det. James C. Lendemer – August 1, 2006

UNITED STATES OF AMERICA. OHIO. GALLIA COUNTY.: Wayne National Forest, above Symmes Creek, along Symmes Creek Road, 1.5 miles south of Masse Road, ~ 2 miles east of Pumpkintown Road, Patriot Quad. - elev. 700-800 ft. - UTM 17 372231E 4298497N – Lat. 38° 49' 34"N, Long. 82° 28' 19"W – South-west facing slope with moist to dry exposed sandstone, soil, and open mixed oak woods. – On sandstone.

James C. Lendemer *et al.* **#7431** May 19, 2006
w/ participants of the 15th Tuckerman Workshop

237. *Candelariella aurella* (Hoffm.) Zahlbr.
Det. Richard C. Harris – December, 2006

UNITED STATES OF AMERICA. NEW JERSEY. BURLINGTON COUNTY.: Lebanon State Forest, at intersection of Savoy Boulevard and NJ Route 72, ~3.5 miles east of Chatsworth, Woodmansie Quad. – elev. 150 ft. - UTM 18 543402E 4410765N – Lat. 39° 50' 52"N, Long. 74° 29' 34"W – Pine (*Pinus*) – oak (*Quercus*) forest with low ericaceous shrubs. – On concrete of railroad bridge.

James C. Lendemer *et al.* **#7550** September 9, 2006
w/ Andy Moroz, William Roberts, Alfred Schuyler *et al.*

238. *Minutoexcipula tuckerae* V. Atienza & D. Hawksw.

UNITED STATES OF AMERICA. ARKANSAS. VAN BUREN COUNTY.: Ozark National Forest, along small creek 1.5 miles west of small artificial lake at Upper Brock Creek Campground, east of FS 1305 creek crossing. – Lat. 35° 29' 25"N, Long. 92° 49' 59"W – [NW ¼ sec. 29 T10N R17W] – Oak-pine woodland with glade openings and abundant sandstone bedrock, outcrops, and boulders. – On thalli of *Pertusaria texana* on lightly shaded decorticate and corticate branches of *Juniperus virginiana* along stream.

Douglas Ladd **#28210** June 22, 2006

239. *Usnea michauxii* I.I. Tav.

UNITED STATES OF AMERICA. FLORIDA. DUVAL COUNTY.: Big Talbot Island State Park, Blackrock Trail, east of A1A, 1.6 miles south of north boundary of park. – Lat. 30° 29' 27"N, Long. 81° 26' 31"W – Coastal oak forest. – On fallen branches of *Quercus laevis*.

Richard C. Harris **#53230** November 24, 2006

240. *Opegrapha varia* Pers.

UNITED STATES OF AMERICA. MISSOURI. COOPER COUNTY.: Lamine River Conservation Area, west of east entry of Coopers Loop, 0.3 miles north of Hwy. A at Brownfield Roadside Park. – Lat. 38° 42' 33"N, Long. 92° 58' 18"W – T.46N., R.19W., sect. 35 SE ¼ - Cherty dolomite outcrops in mixed hardwoods on west-facing slope.

Richard C. Harris **#50777** April 15, 2005

241. *Opegrapha diffacticola* R.C. Harris & Ladd

ISOTYPE

UNITED STATES OF AMERICA. MISSOURI. MARIES COUNTY.: Spring Creek Gap Conservation Area east of CR 340 (Old Hwy 63), ca. ½ mile north of US 63. – elev. 240-320 m. – Lat. 38° 08' 14"N, Long. 91° 48' 08"W – Floodplain forest and dolomite and sandstone in small stream. – On *Bacidia diffracta* S. Ekman, on trunk of *Juniperus virginiana.*

Richard C. Harris **#46555** November 4, 2002

242. *Bacidia diffracta* S. Ekman

UNITED STATES OF AMERICA. MISSOURI. MARIES COUNTY.: Spring Creek Gap Conservation Area east of CR 340 (Old Hwy 63), ca. ½ mile north of US 63. – elev. 240-320 m. – Lat. 38° 08' 14"N, Long. 91° 48' 08"W – Floodplain forest and dolomite and sandstone in small stream. – On trunk of *Juniperus virginiana.*

Richard C. Harris **#46555-A** November 4, 2002

243. *Mycocalicium albonigrum* (Nyl.) Fink

UNITED STATES OF AMERICA. GEORGIA. PUTNAM COUNTY.: Oconee National Forest, end of Forest Service Road 1108 at rapids along Murder Creek. – elev. ca. 150 m. – Lat. 33° 14' N, Long. 83° 28' W – Oak woods with sandstone outcrops. – On base (3 dm to 1.3 m) of old (1 m DBH) *Fraxinus* near creek.

Richard C. Harris **#38700** September 16, 1996

244. *Coenogonium luteum* (Dicks.) Kalb & Lücking s. lat.
Det. James C. Lendemer – March 17, 2007

UNITED STATES OF AMERICA. NORTH CAROLINA. WAKE COUNTY.: William B. Umstead State Park, vicinity of lower Sycamore Lake, ~1 mile southwest of Ebenezer Church, Cary Quad. – elev. 350-400 ft. – UTM 17 702991E 3970946N - Lat. 35° 51' 49"N, Long. 78° 45' 06"W – Ridges and rocky ravines with small creeks and forest varying from disturbed (*Pinus, Betula, Acer*) to mature (*Fraxinus, Acer, Quercus*), open soil banks and large rock outcrops along spillway. – Abundant on the bark of a pines (*Pinus*).

James C. Lendemer *et al.* **#8414** January 14, 2007
w/ Andy Moroz & Gary Perlmutter

245. *Megaspora porphyritis* (Tuck.) R.C. Harris
Det. James C. Lendemer – February 1, 2007

UNITED STATES OF AMERICA. NORTH CAROLINA. WAKE COUNTY.: William B. Umstead State Park, Piedmont Beech Natural Area, south of Crabtree Creek, east of Reedy Creek Lake, just east of Raleigh, ~3.5 miles north of Ashbury, Raleigh West Quad. – elev. 300 ft. – UTM 17 704373E 3968345N - Long. 35° 50' 23"N, Long. 78° 44' 14"W – Mature beech (*Fraxinus*), oak (*Quercus*), maple (*Acer*), hickory (*Carya*) forest with some pine (*Pinus*), small openings with mosses, large fallen trees, and ravines with small rock outcrops. – On the bark of a red maple (*Acer rubrum*).

James C. Lendemer *et al.* **#8349** January 13, 2007
w/ Andy Moroz & Gary Perlmutter

246. *Unknown Sporodochial Crust*
Det. James C. Lendemer – February 1, 2007

UNITED STATES OF AMERICA. NORTH CAROLINA. WAKE COUNTY.: William B. Umstead State Park, vicinity of lower Sycamore Lake, ~1 mile southwest of Ebenezer Church, Cary Quad. – elev. 350-400 ft. – UTM 17 702991E 3970946N - Lat. 35° 51' 49"N, Long. 78° 45' 06"W – Ridges and rocky ravines with small creeks and forest varying from disturbed (*Pinus, Betula, Acer*) to mature (*Fraxinus, Acer, Quercus*), open soil banks and large rock outcrops along spillway. – Abundant on large hardwoods (*Liquidambar, Acer, Quercus*) above edge of lake.

James C. Lendemer *et al.* **#8413** January 14, 2007
w/ Andy Moroz & Gary Perlmutter

247. *Peltigera hydrothyria* Miądl. & Lutzoni
Det. James C. Lendemer – March 14, 2007

UNITED STATES OF AMERICA. PENNSYLVANIA. DAUPHIN COUNTY.: Property of the city of Harrisburg, below spillway of DeHart Dam, ~2 miles east of Carsonville, south of PA Route 325, Enders Quad. – elev. 600 ft. – UTM 18 351579E 4480410N - Lat. 40° 27' 40"N, Long. 76° 45' 02"W – Disturbed margins of dirt road, mixed hardwood (*Acer, Quercus*) / hemlock (*Tsuga*) forest, with small sandstone boulders and shale pebbles. – On bedrock of waterfall of a small stream.

James C. Lendemer **#860** & Jack Stabley March 10, 2007

248. *Alectoria sarmentosa* (Ach.) Ach.
Det. James C. Lendemer – March 17, 2007

CANADA. NEWFOUNDLAND.: Western Brook Pond, ~4 km north of Sally's Cove. – Lat. 49° 46' 08" N, Long. 57° 49' 14" W– Seaside sandstone/limestone outcrops and adjacent coastal forest of mixed conifers and birch (*Betula*) with sparse maple *(Acer*). – On branches of fallen conifers.

James C. Lendemer **#8743** July 20, 2006

249. *Loxospora ochrophaea* (Tuck.) R.C. Harris
Det. James C. Lendemer – March 17, 2007

CANADA. NEWFOUNDLAND.: Western Brook Pond, ~4 km north of Sally's Cove. – Lat. 49° 46' 08" N, Long. 57° 49' 14" W– Seaside sandstone/limestone outcrops and adjacent coastal forest of mixed conifers and birch (*Betula*) with sparse maple *(Acer*). – On the bark of dead conifers.

James C. Lendemer **#8730** July 20, 2006

250. *Cladonia turgida* Ehrh. ex Hoffm.
Det. James C. Lendemer – March 17, 2007

CANADA. NEWFOUNDLAND.: Trout River, behind Crocker Cabins. – Lat. 49º 28' 49" N, Long. 58º 07' 25" W – Disturbed opening in conifer forest. – On soil and organic matter.

James C. Lendemer *et al.* **#8448** July 18, 2006

Literature Cited

Harris, R.C. 1995. More Florida Lichens. Including the 10ø Tour of the Pyrenolichens. Publ. by the Author, Bronx, N.Y. 192 pp.

Staiger, B. 2002. Die Flechtenfamilie Graphidaceae. Studien in Richtung einer natürlicheren Gliederung. Bibliotheca Lichenologica, 85. Berlin, Stuttgart. 526 pp.

Endnotes

1. *Fissurina cypressi* (Müll. Arg.) Lendemer *comb. nov.*

Graphina cypressi Müll. Arg., Bull. Herb. Boiss., 3: 47. 1895. TYPE: USA, Louisiana, in swamps near St. Martinsville, on *Taxodium distichum, A.B. Langlois 877* (PH!, isotype).

As keyed by Harris (1995) *Graphina cypressi* is easily recognized by the rough white thallus, lack of lichen substances, crowded irregular uncarbonized fissurine ascomata, and hyaline muriform ascospores (85-105 x 20-28µm; 1-(2) per ascus). The species is widely distributed in the southeastern United States, where it occurs on the bark of hardwoods. Following the generic concepts of Staiger (2002) the species should be classified in the genus *Fissurina* thus the new combination *F. cypressi* is proposed here.

2. *Fissurina scolecitis* (Tuck.) Lendemer *comb. nov.*

Graphis scolecitis Tuck., Gen. Lich., p. 210. 1872. TYPE: USA. Alabama, *Beaumont s.n.* (H-NYL!, isotype).

Graphina scolecitis (Tuck.) Fink, The Lichen Flora of the United States, p. 115. 1935.

Graphina scolecitis is widely distributed in the southeastern United States, where it is found on the bark of hardwoods. As keyed by Harris (1995) the species could be confused with *G. columbina* (Tuck.) Witrth & Hale (= *Fissurina columbina* (Tuck.) Staiger). The species is easily recognized however, by the lack of lichen substances in the thallus, elongate fissurine ascomata, exciple turning orange-red in KOH, and sub-muriform hyaline ascospores (2-3 x 6-8 celled, 22-32 x 10-11µm, (6)-8 per ascus). Following Staiger (2002) *G. scolecitis* should be classified in the genus *Fissurina*, thus the new combination *F. scolecitis* is proposed here.

Lichenicolous Fungi of the Czech Republic (The First Commented Checklist) by Jana Kocourková. Acta Musei Nationalis Pragae. Sborník Národního Muzea V Praze. Series B-Historia Naturalis, 55, 3-4, pp. 59-167 with eight plates of black and white photographs. 1999 (published in 2000).

This is a treatment of lichenicolous fungi you won't find listed on the web site of Recent Literature on Lichens or in the catalogue of Koeltz Scientific Books. But it is an invaluable reference for those who study lichenicolous fungi. Like so much excellent work being done by lichenologists in Central and Eastern Europe it has not gotten the recognition it deserves. For these reasons, the editor and I thought it should be reviewed though it was published in 2000 and is almost out-of-print.

Jana Kocourková's study of the mycota of the Czech Republic documents 156 species of lichenicolous fungi and lichens. Seventy are new reports for the Czech Republic. Each genus and species is discussed with information on hosts, important observations, worldwide distribution information, and extensive literature citations, and of course cited specimens. There is an excluded or poorly known taxa section. At the end of the work is given a nicely designed host index with a supplement listing hosts by page number for easy reference. There are eight black-and-white plates of 19 taxa. The book is attractively laid-out.

The mycota of lichenicolous fungi in the Czech Republic is diverse and fascinating. *Roselliniopsis groedensis* (Zopf) Matzer & Hafellner on *Ochrolechia lactea* and *Weddellomyces xanthoparmeliae* Calatayud & Nav.-Ros. are among many rare or interesting species that are discussed. *Sclerococcum epiphytorum* Diederich was known only from the type collection on a corticolous *Pertusaria* and was described in *Mycotaxon* in 1990. Two collections are reported from the Czech Republic on corticolous *Pertusaria*. As to be expected, many common lichens such as *Baeomyces rufus, Phaeophyscia orbicularis, Xanthoparmelia* species, are the hosts of four or more lichenicolous fungi.

There are no keys and no detailed description of species so the extensive literature citations are of value for further research. The host information and index is useful for finding or eliminating possible species when determining new specimens, or of being aware of possible hosts that should be singled out in for investigation.

Kocourková's observations are invaluable. There is important information on ecology, for instance if the fungi were more prevalent at high relative humidity sites or not, etc. The descriptions of what the infections look like are concise. Kocourková often enumerates which species each fungus is normally found growing with on the host as well as gives important information for distinguishing species in a genus. Five years of field work and innumerable hours in herbaria underlie her observations. Unfortunately all this information is not given in a consistent form for each species. Of equal value are Kocourková's discussions of taxonomic problems.

The English is good and was reviewed by Thomas Nash.

Only 18 copies of *Lichenicolous Fungi of the Czech Republic* remain for sale before it goes out-of-print. It can be purchased from Myris Trade, s r. o., Pod višňovkou 1662/21, P-4. E-mail: myris@myris.cz

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Opuscula Philolichenum
Volume 4, 2007

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